



# FACT BOOK

NAVAL RESEARCH LABORATORY

Washington, D.C. 20375

MARCH 1975

514098

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This document has been prepared as  
a reference source of factual information  
about the Naval Research Laboratory.

March 1975

The Naval Research Laboratory has a continuing need for physical scientists, mathematicians, engineers, and supporting personnel. Vacancies are filled without regard to race, creed, color, sex, or national origin. Information concerning current vacancies will be gladly furnished upon request. Address all such inquiries to the Personnel Office (Code 1800), Naval Research Laboratory, Washington, D.C. 20375.

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Aerial view of the Naval Research Laboratory main site

# The Naval Research Laboratory

## MISSION

To conduct a broadly based multidiscipline program of scientific research and advanced technological development directed toward new and improved materials, equipment, techniques, systems, and related operational procedures for the Navy. In fulfillment of this mission, the Naval Research Laboratory:

- (a) Initiates and conducts scientific research of a basic and long-range nature in scientific areas of special interest to the Navy.
- (b) Conducts exploratory and advanced technological development deriving from or appropriate to the scientific program areas.
- (c) Within areas of technological expertise, develops prototype systems applicable to specific projects.
- (d) Performs scientific research and development for other Naval commands and, where specially qualified, for other agencies of the Department of Defense and, in defense related efforts, for other Government agencies.
- (e) Upon request from appropriate naval commands, assumes responsibility as the Navy's principal R&D center in areas of unique professional competence.
- (f) Provides to the Navy and its contractors standardized techniques and procedures for measurements and the accurate calibration of standard instruments in areas of special Navy needs.
- (g) Furnishes scientific consultative services for the Navy and, where specially qualified, for other agencies of the Department of Defense and, in defense related efforts, for other Government agencies.
- (h) Provides to the Navy determinations of performance characteristics of developmental and prototype devices through limited engineering test and evaluation services.

## THE NAVY'S CORPORATE LABORATORY

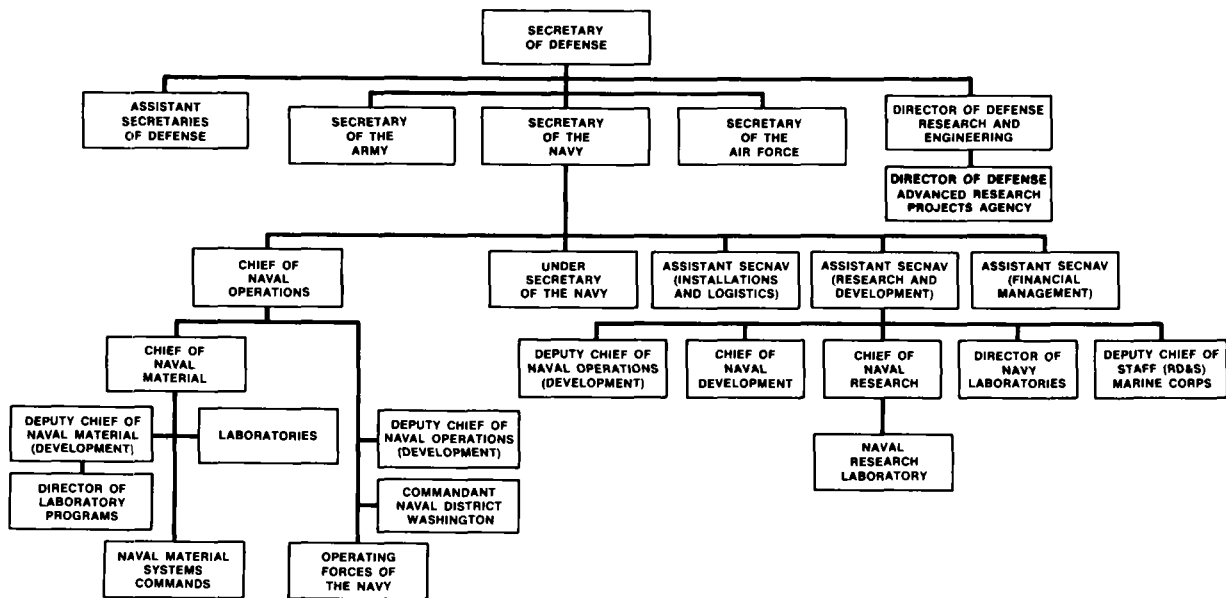
The Naval Research Laboratory is one of the principal in-house research and development institutions of the U.S. Government. It was established in 1923 to ensure that advancements in science and engineering could be readily applied to the Navy's needs. Directed always toward this end, the NRL research program has developed to its present status as a broadly based and coordinated effort in the physical, mathematical, and environmental sciences, in advanced engineering, and in naval analysis. The work of the Laboratory is conducted at the main establishment in the District of Columbia and at various field sites that provide unique environment and facilities not available at the main site.

Some principal elements of the research program include fundamental and applied work in radio wave propagation, oceanography, deep-sea instrumentation, submarine air purification, structural design theory, fracture mechanics, surface chemistry, optical physics, radar, underwater sound propagation, acoustic signal processing, sonar transducers, nuclear physics, radio astronomy, high-temperature lubricant, high-energy fuels, plasma physics, refractory metals, exotic materials for high-performance structures, x-ray astronomy, high-power lasers, solid-state physics, and stress-corrosion cracking of high-strength titanium steels and aluminum alloys.

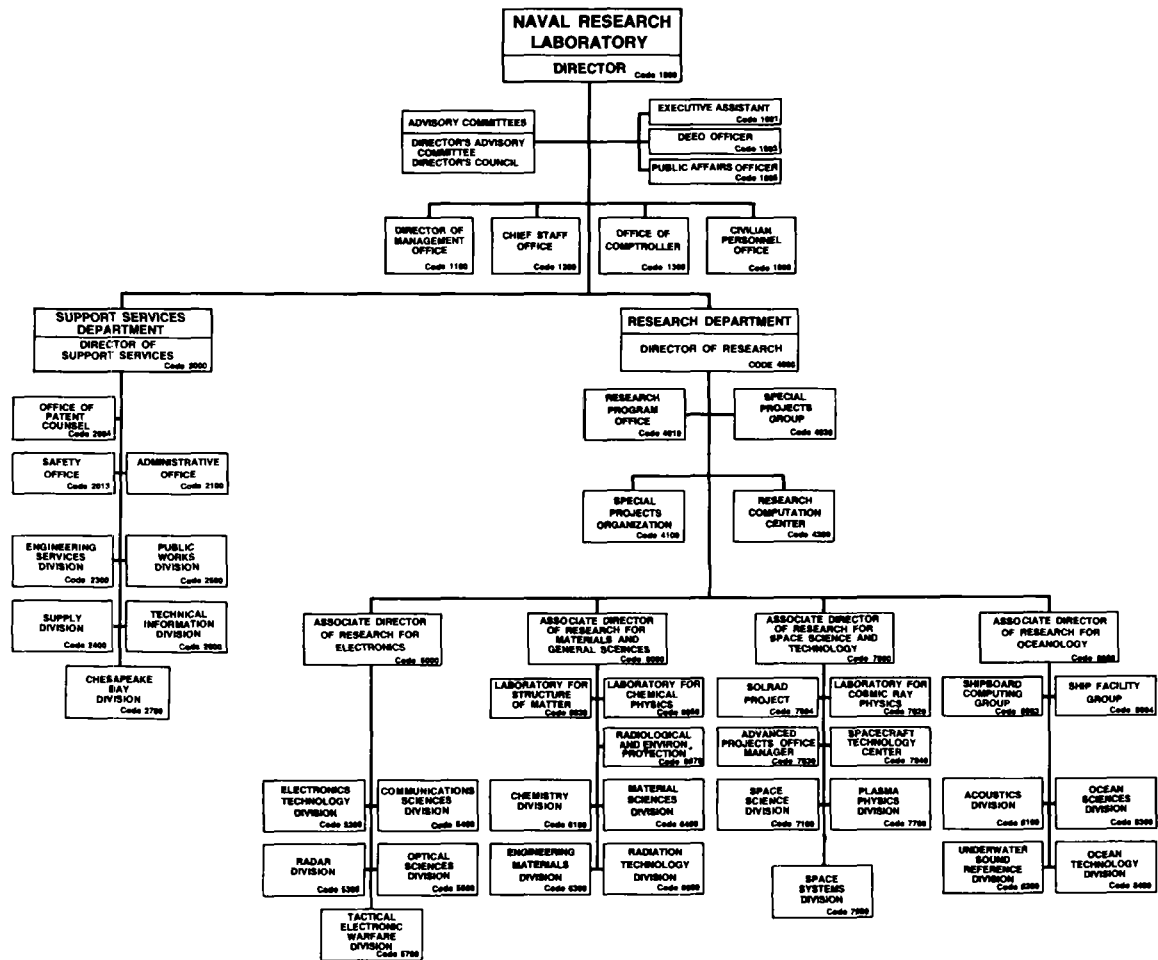
About 1750 scientific and technical papers were produced in 1973 as a consequence of the research and development effort of the Laboratory staff. The figure includes 178 formal reports, 156 memorandum reports, about 650 articles published in professional society journals, and over 752 papers presented at scientific and technical meetings in the United States and in foreign countries.

In addition, 79 U.S. patents were issued in 1973 on inventions made by present and former employees of the Naval Research Laboratory. This figure brings the grand total of NRL patents, through the calendar year 1973, to 2417.

In its investigations of broad scientific areas, in considering its findings for potential military applications, and in furnishing to the Naval Systems Commands and Secretariat expert consultative services relating to science and military systems, NRL functions as the corporate laboratory of the Navy. Thus it provides a central focus of research and development activity that supports the Navy. When NRL findings and capabilities have borne fruit in particular areas, the results are made known to and used by not only the Navy but also the Army, the Air Force, the Defense Advanced Research Projects Agency, the Atomic Energy Commission, and other agencies of the government.



Position of NRL in the Department of Defense structure



Organization chart of NRL

## MILITARY AND CIVILIAN PERSONNEL

### Military Personnel Attached to NRL as of Feb. 1, 1975

<i>Officers</i>	<i>Authorized</i>	<i>On Board</i>
Captain	4	3
Commander	12	9
Lieutenant Commander	13	17
Lieutenant	12	9
Lieutenant (Junior Grade)	2	2
Ensign	0	0
Warrant Officer	<u>3</u>	<u>3</u>
Total	46	43
<i>Enlisted</i>	85	89

### Civilian Employees on Rolls as of June 30, 1974

10 USC 1581 (formerly Public Law 313)		22
Classification Act (GS)		3027
Scientific & Professional	1511	
Technical Supporting	784	
General Administrative & Clerical	732	
Wage Board		792
General Wage Service (WG)	634	
Apprentices (WB)	59	
Printing & Lithographic Service (WI)	18	
Supervisory General Wage Service (WS)	57	
Supervisory, Planners & Estimators (WN)	2	
Planners, Estimators, etc.	20	
Leaders (WL)	2	
Total		3841

### Annual Civilian Turnover Rate (percent)

	<u>1972*</u>	<u>1973*</u>	<u>1974</u>
Research Department	7.8	7.5	5.9
Nonresearch Areas	9.6	12.0	11.3
Entire Laboratory	8.5	9.4	8.2

\*Cost-of-living pension increases influenced the number of retirees

### Highest Academic Degrees Held by Permanent Employees (as of Sept. 1, 1974)

Bachelors	658
Masters	372
Doctorates	505

## FISCAL INFORMATION

### NRL FUNDING BY MAJOR SPONSOR

FISCAL YEARS 1974 AND 1975

Sponsor	FY 1974 (Act)		FY 1975 (Est)	
	Millions of Dollars	Percent	Millions of Dollars	Percent
R&D PROGRAM				
ONR	29.9	17.8	32.0	19.9
SHIP	14.7	8.8	14.4	8.9
ELEX	58.3	34.7	63.4	39.4
AIR	15.2	9.0	14.9	9.3
ORD	—	—	—	—
OTHER NAVY	22.7	13.5	12.5	7.8
TOTAL NAVY	140.8	83.8	137.2	85.3
OTHER DOD	12.7	7.6	10.9	6.8
NON-DOD	9.4	5.6	8.0	5.0
TOTAL R&D	162.9	97.0	156.1	97.1
NON R&D	3.9	2.3	3.2	2.0
CAPITAL IMPROVEMENT	1.2	0.7	1.4	0.9
TOTAL FUNDS	168.0	100.0	160.7	100.0

### EXPENDITURES (Excluding Plant Account Funds) FY 1974-1975

Purpose	During FY 1974	During FY 1975
Materials, supplies and parts	\$ 22,000,000	\$ 19,900,000
Salaries and wages	72,000,000	77,300,000
Contractual services and other costs	72,800,000	62,100,000
TOTAL	\$166,800,000	\$159,300,000

### CAPITAL PROPERTY

As of June 1974

Class 1 (Land)	\$ 434,686
Class 2 (Buildings and improvements)	81,557,171
Class 3 (Equipment)	21,230,327
Class 4 (Industrial production equipment)	17,536,010
TOTAL CAPITAL PROPERTY	\$120,758,194

## Office of the Director

The Director of the Naval Research Laboratory is a Navy Captain with appropriate educational background and experience. He is responsible for the overall operation and management of the Laboratory and its programs, and he executes the usual functions of command of a naval shore activity. The Directors of the Laboratory's two Departments, Research and Support Services, report to the Director. In carrying out the functions of his office, the Director is assisted by the Chief Staff Officer, the Comptroller, the Director of Civilian Personnel, an Executive Assistant, an EEO Coordinator, and a Public Affairs Officer.

## Director, Naval Research Laboratory



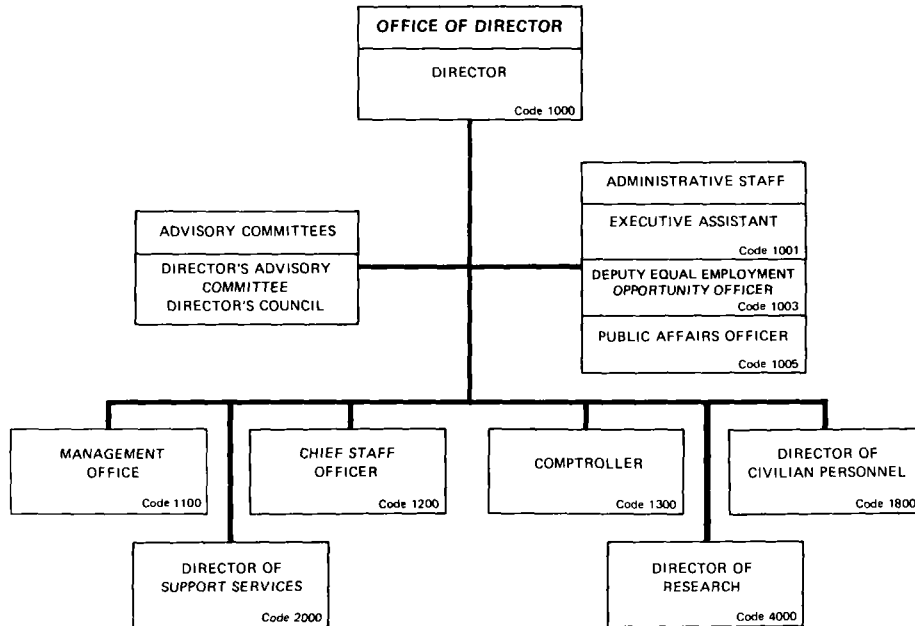
Captain John T. Geary, USN

CAPT GEARY [REDACTED] He graduated from the U.S. Naval Academy in 1946, at which time he was commissioned Ensign, USN. He received an M.S. degree in engineering electronics from the U.S. Naval Postgraduate School in 1953 and an M.S. degree in business administration from the George Washington University in 1970. He graduated from ICAF (Industrial College of the Armed Forces) in 1970; he also attended numerous service schools, including, among others, the Defense Weapons Systems Management School and the Naval Radar Training School.

CAPT GEARY served in various shipboard assignments, including destroyers, cruisers, and amphibious ships, and as the operations officer for Commander, Destroyer Squadron 15, and was an instructor in electronics at the Naval Academy. Designated for Engineering Duty in 1956, he was assigned to Pearl Harbor Naval Shipyard and to Commander, Service Force U.S. Atlantic Fleet in electronics billets before coming to NRL in 1962 as Project Officer and BUSHIPS Liaison Officer. In 1964, he transferred to BUSHIPS, where he became the Head, Electronics Warfare Branch and managed many R&D Programs (approximately \$50M annually) in electronics countermeasures systems and equipments. After 1 year at ICAF, he reported to NAVAIR as Director, Astronautics Division, providing SYSCOM management of Navy R&D efforts in Space, including Program 749, SOLRAD, and Timation, among others. CAPT GEARY served for 2 years in NAVELEX as ELEX 01, the Deputy Commander for Planning, Programming, and Resources Management, responsible for the overall management of NAVELEX's growing programs and budget, and as ELEX 05, Deputy Commander for Acquisition Engineering, as well as the Command's Inspector General.

He is a member of the Institute of Electrical and Electronics Engineers and the American Society of Naval Engineers.

# OFFICE OF THE DIRECTOR



## Key Personnel

<u>Name</u>	<u>Title</u>	<u>Code</u>
CAPT J.T. Geary, USN	Director	1000
Mr. S.L. Cohen	Executive Assistant	1001
Mr. W.H. Webster	DEEO Officer	1003
Mr. J.E. Sullivan	Public Affairs Officer	1005
Mr. A.M. Toscano	Director, Management Office	1100
CAPT J.M. Brozena, USN	Chief Staff Officer	1200
Mr. P.F. Kennedy	Comptroller	1300
Mr. F.D. Wallace	Director of Civilian Personnel	1800
CAPT M.V. Ricketts, USN	Director of Support Services	2000
Dr. A. Berman	Director of Research	4000

## EXECUTIVE ASSISTANT

### Basic Responsibilities

The Executive Assistant provides the Director with executive level staff and managerial support in connection with the duties, interests, and activities of the Director.



Mr. S. L. Cohen

## DEPUTY EQUAL EMPLOYMENT OPPORTUNITY OFFICER

### Basic Responsibilities

The Deputy Equal Employment Opportunity Officer serves as an advisor to the Director on EEO matters; conducts surveys and studies relating to NRL's Affirmative Action Plan and recommends methods for achieving its goals of a fully integrated work force; acts as ex officio member of the EEO Committee; and assists the EEO counselors in settling initial complaints of alleged discrimination.

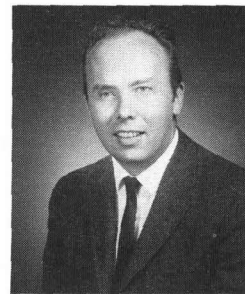


Mr. W. H. Webster

## PUBLIC AFFAIRS OFFICER

### Basic Responsibilities

The Public Affairs Officer advises the Director and staff on all matters concerning public information, and he supervises the Laboratory's public affairs programs.



Mr. J. E. Sullivan

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# MANAGEMENT OFFICE

## Basic Responsibilities

The Management Office serves as the central management analysis support office and provides staff support to management officials of the Laboratory in matters of administrative operations, management control, facilities planning, and management information systems.

## Key Personnel

Name  
Mr. A.M. Toscano

Title  
Director, Management Office



Mr. A. M. Toscano

## Personnel Complement

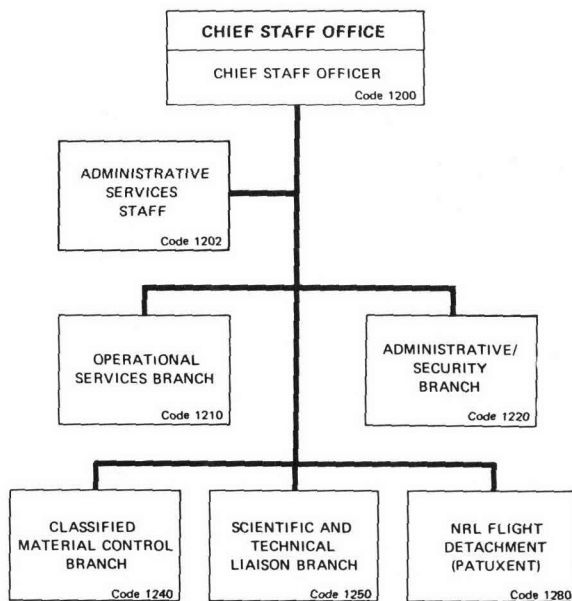
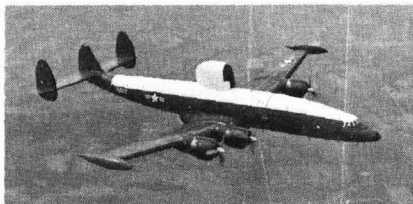
On Board: 9



CAPT J. M. Brozena, USN

## Chief Staff Office

- OPERATIONAL SERVICES
- SECURITY
- CLASSIFIED MATERIAL CONTROL
- SCIENTIFIC AND TECHNICAL LIAISON



### Basic Responsibilities

The Chief Staff Officer provides a military staff to the Director, Naval Research Laboratory, for the purpose of assisting the Director in the military aspects of the management of the Laboratory. He conducts liaison with DOD and Navy Commands and activities and the operating forces of the Navy in support of NRL research and development operations and the coordination of the military application of the scientific work of the Laboratory. The Staff supports four multi-engine Laboratory aircraft and obtains and coordinates such additional air, surface, and subsurface services as are required. The Military Staff is also responsible for personnel and plant security, communications, and control of classified material.

### Key Personnel

<u>Name</u>	<u>Title</u>
CAPT J.M. Brozena, USN	Chief Staff Officer
Mr. J.R. Gallagher	Administrative Officer
LT R.L. Bakkila, USN	Communications/Military Personnel Officer
CDR S.E. Kish, USN	Operational Services Officer
CDR L.R. Marshall, USN	Administrative/Security Officer
Mr. W.C. Bryan	Head, Special Activities Office
Mr. R.E. Abercrombie	Head, Security Section
Mr. J.J. Bagley	Classified Material Control Officer
CDR W. Glickman, USN	Scientific and Technical Liaison Officer
CDR G. Janulis, USN	OIC, NRL Flight Detachment (Patuxent)

### Personnel Complement

On Board: 157  
(84 Civilian, 73 Military)



Mr. P. F. Kennedy

# Office of the Comptroller



INTERNAL  
REVIEW

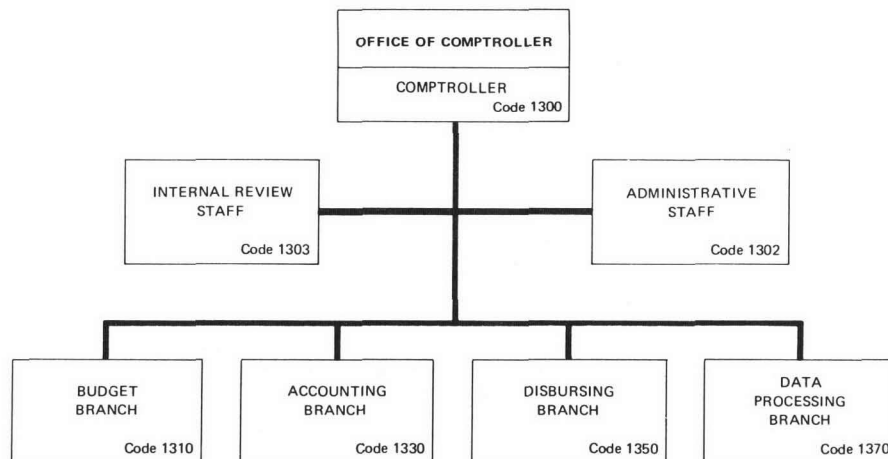
BUDGET OFFICE



COMPUTER



- BUDGET
- ACCOUNTING
- DISBURSING
- DATA PROCESSING



### Basic Responsibilities

The Comptroller is the financial adviser to the Director and other officials of the Laboratory. He administers the financial program of the Laboratory.

### Key Personnel

<u>Name</u>	<u>Title</u>
Mr. P.F. Kennedy	Comptroller
Mrs. Luna M. Boehlert	Administrative Assistant
Mr. D.M. Johnson	Budget Officer
Mr. E.S. York	Accounting Officer
Mr. A.E. Thomas	Disbursing Officer
Mr. R.L. Guest	Data Processing Officer
Mr. K.R. Hildreth*	Head, Internal Review Staff

### Personnel Complement

On Board: 101

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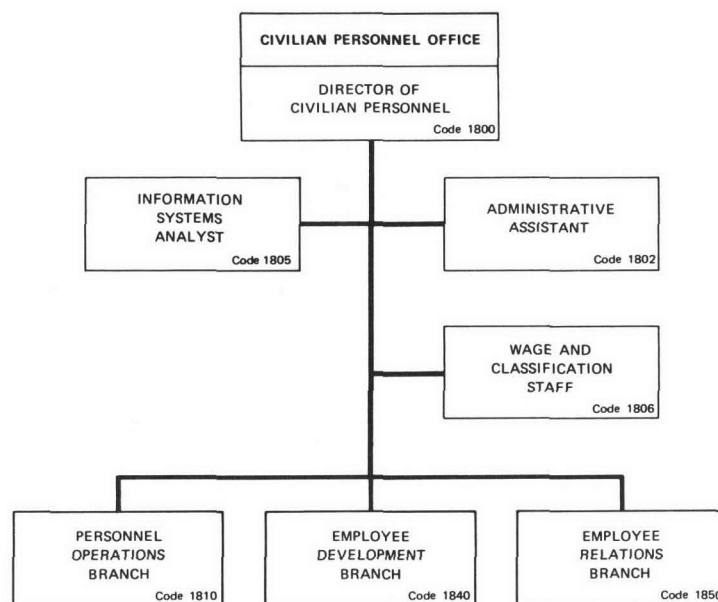
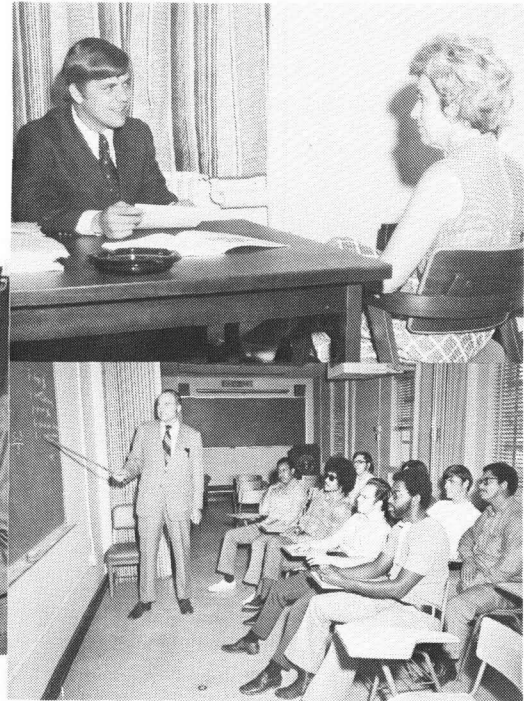
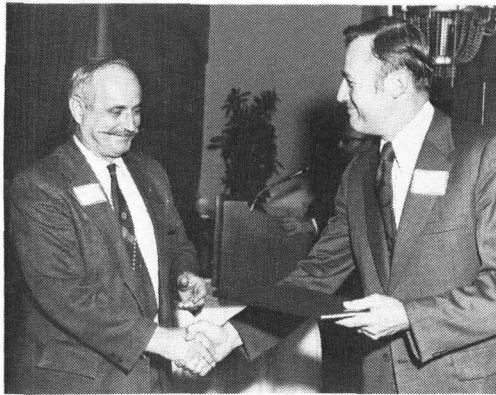
\*Acting



Mr. F. D. Wallace

# Civilian Personnel Office

- PERSONNEL OPERATIONS
- WAGE AND CLASSIFICATION
- EMPLOYEE DEVELOPMENT
- EMPLOYEE RELATIONS



### Basic Responsibilities

The Civilian Personnel Office administers the Laboratory's personnel program, which includes selection, development, promotion, utilization, appropriate recognition, and employee counseling and services for all civilian personnel.

### Key Personnel

<u>Name</u>	<u>Title</u>
Mr. F.D. Wallace	Director of Civilian Personnel
Mrs. Jacqueline Gandy	Administrative Assistant
Mrs. Evelyn W. Sutton	Information Systems Analyst
Miss Dorothy A. Myers	Head, Wage and Classification Staff
Mr. D.J. Blome	Head, Personnel Operations Branch
Mrs. Sylvia K. Wahler*	Head, Employee Development Branch
Mr. H.H. Kay	Head, Employee Relations Branch

### Personnel Complement

On Board: 50

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\*Acting

# The Research Department

The Research Department is headed by a civilian Director of Research who reports to the Director of NRL. The Department is comprised of four organizational areas of research — Electronics, Materials and General Sciences, Space Science and Technology, and Oceanology — each of which is headed by an Associate Director of Research. Encompassed by these four broad areas of research, which correspond to the principal areas of the Navy's interest in the physical and engineering sciences, are 17 divisions and additional special groups. Each division is headed by a civilian scientist and is comprised of an average of about 110 scientific, technical, and administrative personnel. The special groups average about 13 persons each. Three of the special groups (Laboratory for the Structure of Matter, Laboratory for Chemical Physics, and Laboratory for Cosmic Ray Physics) are headed by Chief Scientists who occupy corresponding "Chairs of Science."

The Director of Research is the Chief Scientist for the Laboratory; in this capacity he is responsible for:

- the conduct and effectiveness of the research program with direct authority and accountability for the technical work.
- long range and broad overall planning and programming.
- evaluating and accepting, modifying, or rejecting R&D proposals from NRL's scientific divisions; and for evaluating and recommending to the Director of NRL the acceptance or rejection of new problems from other activities.
- Research Department administration and the budgeting of funds.
- hiring, promoting, and effecting other personnel actions for Research Department personnel.

The Director of Research keeps the Director of Support Services informed at all times of the service needs of the scientific divisions and of any obstacles which may be impeding technical work of the Laboratory; he advises the Comptroller relative to requirements and control of funds; he also is encouraged to advise the Chief of Naval Research directly of the progress of the research program and of the overall climate for research at the Laboratory.

## Director of Research



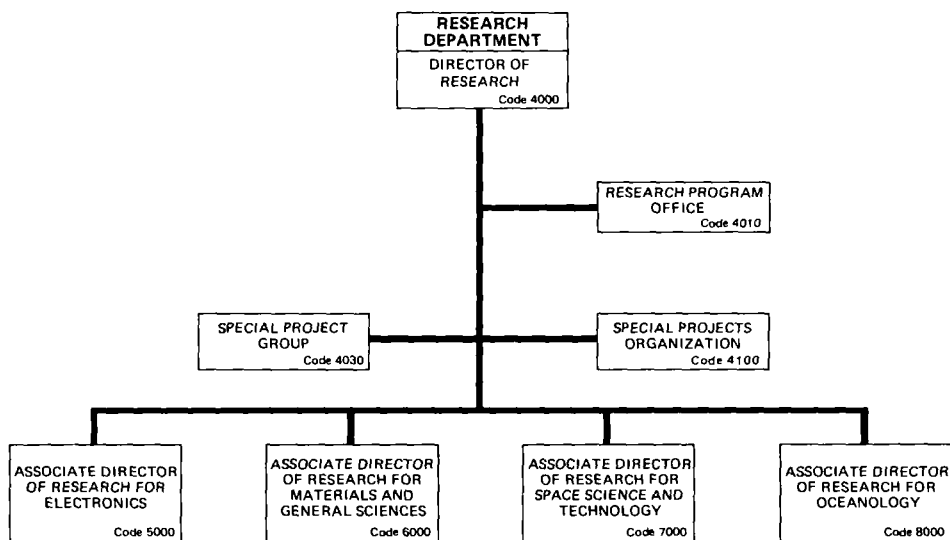
Dr. Alan Berman

Dr. Berman [REDACTED]. He received the A.B. degree in physics from Columbia College in 1947 and the Ph.D. degree in physics from Columbia University in 1952.

From 1952 to 1955 he was a research scientist at the Hudson Laboratories of Columbia University. He became Assistant Director of Hudson Laboratories in 1955, Associate Director in 1957, and Director in 1963. On May 29, 1967, Dr. Berman became Director of Research for the Naval Research Laboratory.

Dr. Berman's research specialties include the areas of underwater acoustics, oceanography, and signal processing. He has published numerous papers on these and related subjects. At present he is a member of a wide variety of Navy advisory groups. He also provides advisory services for a number of Department of Defense and other Government agencies.

Dr. Berman has on three occasions been visiting scientist to the Admiralty Research Laboratory, Teddington, England (1955, 1957, 1960), and once at the SACLANT ASW Research Center, La Spezia, Italy (1960).



#### Key Personnel

<u>Name</u>	<u>Title</u>	<u>Code</u>
Dr. A. Berman	Director of Research	4000
Miss Sally G. O'Riordan	Administrative Assistant	4002
Mr. H.P. Gates	Consultant	4003
Mr. A. Hollings	Head, Research Program Office	4010
CDR G.C. Jarratt, USN	Head, Special Project Group	4030
Mr. R.E. Ellis	Head, Special Projects Organization	4100
Mr. A.B. Bligh	Head, Research Computation Center	4200
Dr. H.Q. North	Associate Director of Research for Electronics	5000
Dr. A.I. Schindler*	Associate Director of Research for Materials and General Sciences	6000
Dr. H. Rabin	Associate Director of Research for Space Science and Technology	7000
Dr. R.R. Goodman	Associate Director of Research for Oceanology	8000

\*Acting

# RESEARCH PROGRAM OFFICE

## Basic Responsibilities

The Research Program Office serves as staff to the research directorate of the Laboratory. It provides an orderly plan for coordinating NRL research programs with those of ONR and other sponsors or potential sponsors throughout the Departments of the Navy, the Army, and the Air Force, the Defense Advanced Research Projects Agency, and other agencies of the government. It also serves as a focal point for program information for project managers and other key personnel of sponsoring activities on work in progress or in various stages of planning. The Research Program Office maintains a management information center which serves as a working tool for the Laboratory directorate, and it maintains appropriate records of the Laboratory's research programs.

## Key Personnel

<u>Name</u>	<u>Title</u>
Mr. A.J. Hollings	Head, Research Program Office
Mr. R.E. Seebold	Deputy Head, Research Program Office
Mr. R.C. Spragg	Head, Management Information Center Section
Mr. R.E. Seebold	Head, Short-Range Program Planning and Appraisal Section
Mr. N. Moglen	Staff Assistant — ADP



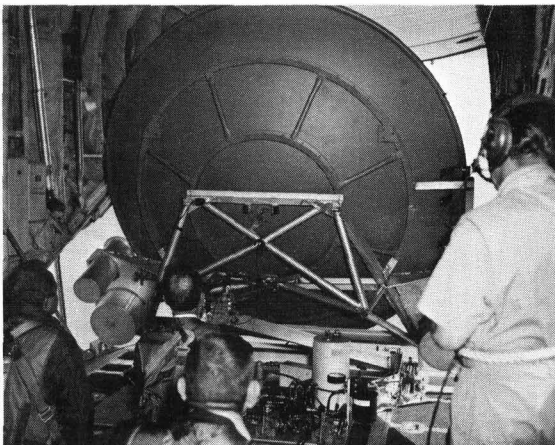
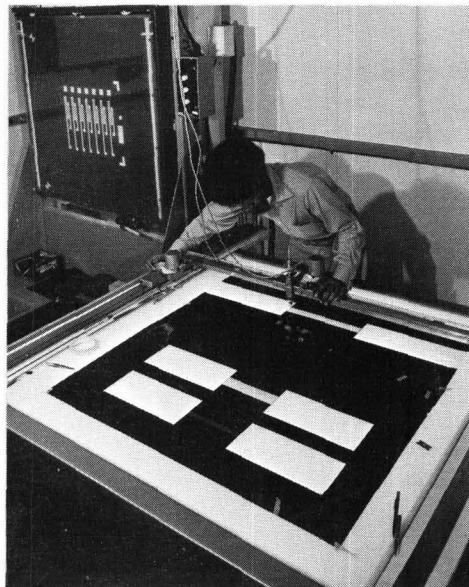
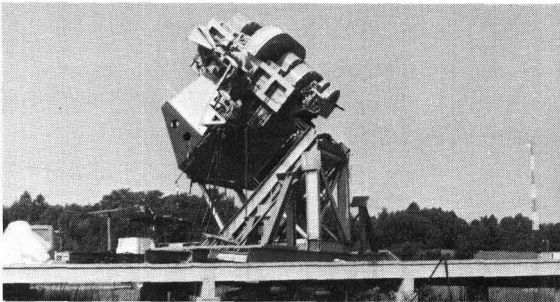
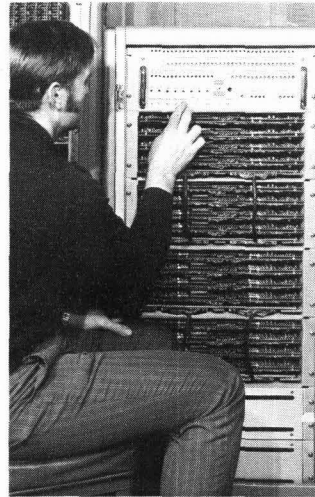
Mr. A. J. Hollings

## Personnel Complement

On Board: 12

## Electronics Area

The Navy's operational effectiveness depends greatly on its ability to make optimum use of the electromagnetic spectrum ranging from the very low to the extremely high frequencies. Accordingly, most of this Area's work is directed toward extending both the knowledge and the technological applications of the electromagnetic spectrum. The effort includes investigations of electronic devices, the phenomenology and advanced instrumentation associated with radio communications, radar, and related sensors, and digital computation and information-processing. NRL also serves as the lead laboratory for the Navy's exploratory development program in electronic warfare.



## Associate Director of Research for Electronics



Dr. Harper Q. North

Dr. North [REDACTED] He graduated from the California Institute of Technology in 1938 with a B.S. degree in science. He obtained his M.A. and Ph.D., both in physics, from the University of California at Los Angeles, in 1940 and 1947, respectively. He completed the University of California at Los Angeles Executive Program in Business Management in 1958.

Dr. North joined the Research Department of NRL as the Associate Director of Research for Electronics on 17 March 1975. He came to NRL from the Northrop Corporation where, since 1973, he had been the Consultant to the Division General Manager. From 1969 to 1973, as Head of the Electro Optical Department of Northrop, he was responsible for developing a family of digitally addressed, flat cathode-ray tubes for military applications.

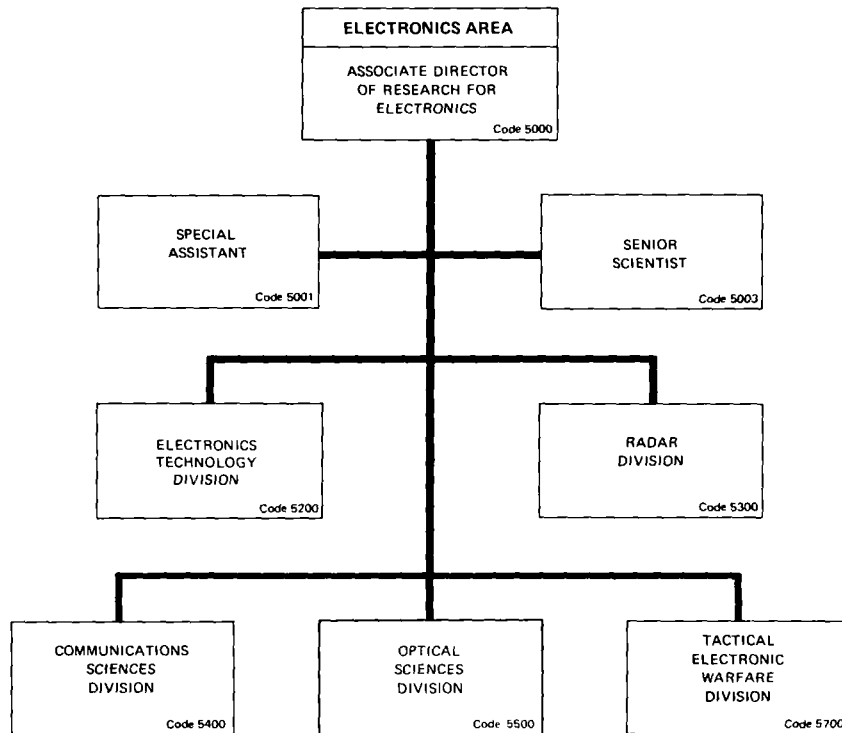
From 1962 to 1969 Dr. North was Corporate Vice President, Research and Development, for TRW, Inc. In 1954 he founded Pacific Semi-Conductors, Inc. (now the TRW Semi-Conductor Division) and was the Company's President from 1954 to 1962.

From 1949 to 1954, he was Director of the Semi-Conductor Division of the Hughes Aircraft Company, and he holds patents on the familiar miniature glass diode which has been manufactured throughout the world.

From 1940 to 1949, Dr. North worked as a Research Associate in the General Electric Research Laboratory, where he was involved in various research and development projects, including the development of radar mixer crystals, and the discovery of the "varactor diode" principle in germanium.

Dr. North served for 2 years as Chairman of the Board of Governors of the Electronic Industries Association, and he received the Organization's Medal of Honor in 1966. He has written numerous articles and papers on a variety of technical subjects, technological forecasting, and management. He also holds a number of patents.

Dr. North is a Fellow of the Institute of Electrical and Electronic Engineers and a Fellow of the American Physical Society. He has served for several years as Chairman of the Advisory Group on Electron Devices, Office of the Department of Defense, Research and Engineering.



### Key Personnel

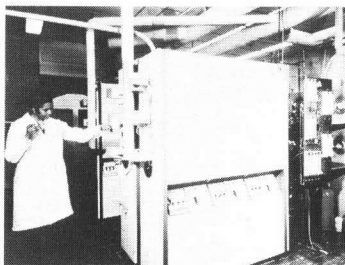
<u>Name</u>	<u>Title</u>
Dr. H.Q. North	Associate Director of Research for Electronics
Mr. P.L. Lester	Special Assistant
Dr. L.B. Wetzel	Senior Scientist
Mr. L.A. Gebhard	Consultant
Mr. H. Bress	Consultant
Mr. A. Brodzinsky	Superintendent, Electronics Technology Division
Dr. M.I. Skolnik	Superintendent, Radar Division
Dr. B. Wald	Superintendent, Communications Sciences Division
Dr. L.F. Drummeter, Jr.	Associate Superintendent, Optical Sciences Division
Mr. L.A. Cosby	Superintendent, Tactical Electronic Warfare Division



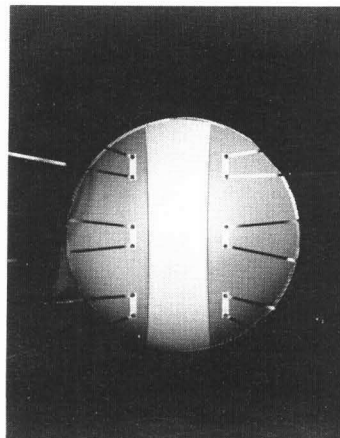
Mr. A. Brodzinsky

# Electronics Technology Division

- SOLID STATE DEVICES
- ELECTRON PHYSICS
- ELECTRONIC MATERIAL TECHNOLOGY
- SURFACE PHYSICS
- MICROWAVE TECHNIQUES
- MICROELECTRONICS

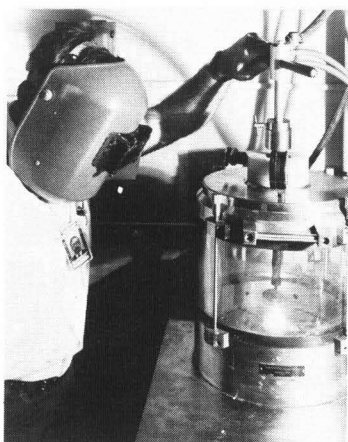
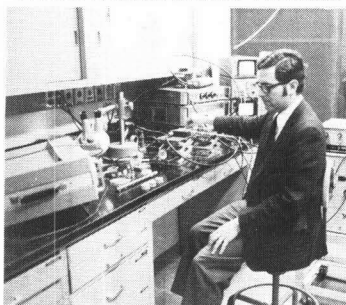


FABRICATION OF SOLID STATE DEVICES

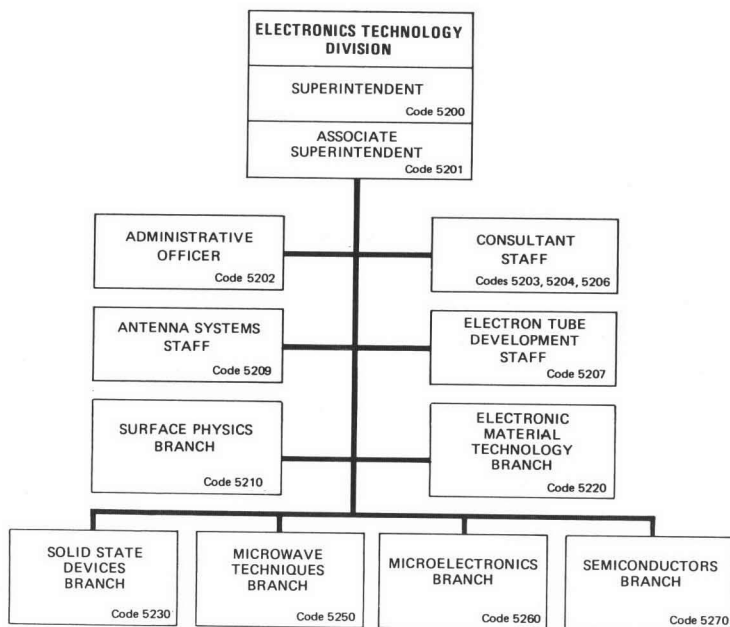


SURFACE ACOUSTIC WAVE DELAY LINES FABRICATED ON SILICON WAFER WITH THE USE OF ZINC OXIDE LAYERS

TRAPATT/DIODE CIRCUIT PROGRAM



ARC PLASMA GROWTH



## Basic Responsibilities

The Electronics Technology Division carries out programs of basic and applied research and development in the fields of electronic properties of solid materials, materials development, surface physics, microwave and antenna techniques, microelectronic devices research and fabrication, high power microwave generation, and basic research in electronic materials, especially semiconductors. The activities of the Division couples device research both to basic materials investigations and to systems research and development needs.

### Branches

#### Solid State Devices

Ion Implantation Technology  
High and low power devices for energy conversion  
Bi-polar device reliability and failure analysis  
MIS failure physics; radiation vulnerability and hardening

#### Electronic Material Technology

Preparation and development of magnetic dielectric, optic, and semiconductor materials  
Optical components and coatings, glass blowing, and microwave tube assembly

#### Surface Physics

Thermionic Energy Conversion  
Electron Emitter Research and Fabrication  
Bonding and Adhesion Studies  
Microwave Tube and Solid State Device Reliability  
Growth of Thin Films and Passivating Layers  
Surface, Junction and Interface Research

#### Microwave Techniques

Surface Acoustic Waves  
Microwave Integrated Circuits  
Surface Magnetostatic Waves  
Microwave Solid State Sources  
Microwave Modules and Subsystems  
Microwave Antenna Research  
Microwave Ferrimagnetic Components  
Millimeter Wave Device Research

#### Microelectronics

Silicon service processing  
CCD Technology and Applications  
MIS Reliability  
Infrared CID Technology  
III-V Semiconductor Device Development

#### Semiconductors

Solid State Theory  
Electrical and Optical Characterization of Materials  
Impurity and Defect Studies  
Structural and Electronic Properties of Amorphous Semiconductors  
Optical and Magneto-optical Studies of Surfaces and Interfaces

### Key Personnel

<u>Name</u>	<u>Title</u>
Mr. A. Brodzinsky	Superintendent
Dr. R.W. Wright	Associate Superintendent
Mrs. Mary H. Grimes	Administrative Officer
Mr. L.M. Winslow	Consultant
Mr. N. Vanderplaats	Head, Electron Tube Development Staff
Dr. W.F. Gabriel	Head, Antenna System Staff
Dr. J.E. Davey	Head, Solid State Devices Branch
Mr. H. Lessoff	Head, Electronic Material Technology Branch
Dr. G.A. Haas*	Head, Surface Physics Branch
Dr. L.R. Whicker	Head, Microwave Techniques Branch
Dr. D.F. Barbe*	Head, Microelectronics Branch
Dr. B.D. McCombe*	Head, Semiconductors Branch

Personnel Complement: 114

Fiscal Year 1975: \$6,028,000

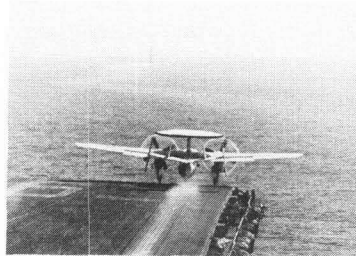
\*Acting



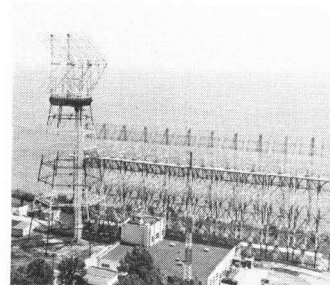
Dr. M. I. Skolnik

# Radar Division

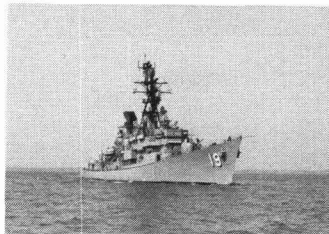
*AIRBORNE EARLY WARNING RADAR  
SYNTHETIC APERTURE RADAR*



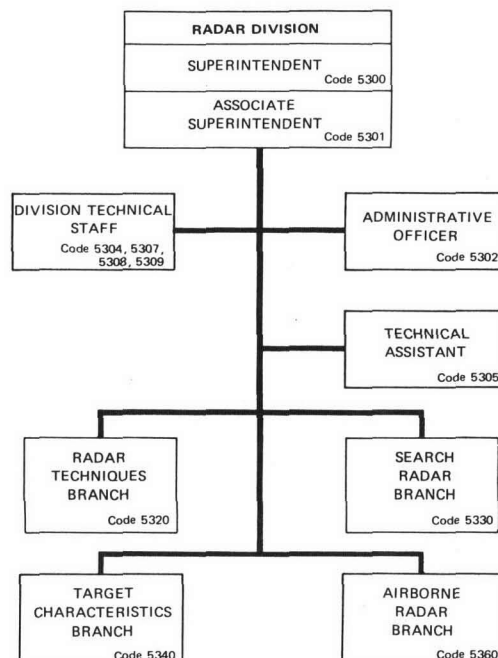
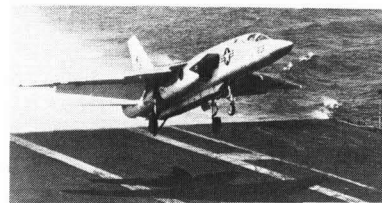
*OVER THE HORIZON RADAR  
"MADRE"*



*SHIPBOARD SURVEILLANCE  
AND WEAPON CONTROL RADAR*



*AIRBORNE-INTERCEPTOR RADAR*



## Basic Responsibilities

The Radar Division conducts research on basic physical phenomena of importance to radar and related sensors, investigates new engineering techniques applicable to radar, demonstrates the feasibility of new radar concepts and systems, performs related systems analysis and evaluation of radar, and provides special consultative services. The emphasis is on new and advanced concepts and technology in radar and related sensors which are applicable to enhancing the Navy's ability to fulfill its mission.

## Staff Activity

### Division Technical Staff

Radar Analysis	Mechanical Design
Systems Research	Systems Analysis

## Branches

### Radar Techniques

High-frequency radar  
Signal processing

### Search Radar

Phased array techniques  
Precision tracking radar techniques  
Radar evaluation  
Range instrumentation  
Signal processing

### Target Characteristics

Target signature analysis  
ECCM  
System concepts for shipboard radar

### Airborne Radar

Airborne radar  
Airborne early warning radar  
Moving target indication  
Synthetic Aperture Radar (SAR)

## Key Personnel

<u>Name</u>	<u>Title</u>
Dr. M.I. Skolnik	Superintendent
Mr. J.H. Dunn	Associate Superintendent
Mrs. Anna G. Dunn	Administrative Officer
Mr. W.N. Shaddix	Technical Assistant
Mr. J.M. Headrick	Head, Radar Techniques Branch
Dr. R.J. Adams	Head, Search Radar Branch
Mr. I.D. Olin	Head, Target Characteristics Branch
Mr. D.L. Ringwalt	Head, Airborne Radar Branch

## Personnel Complement

On Board: 140

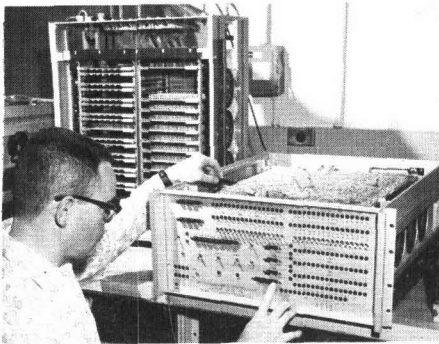
## Total Estimated R&D Funding

Fiscal Year 1975: \$7,100,000



Dr. B. Wald

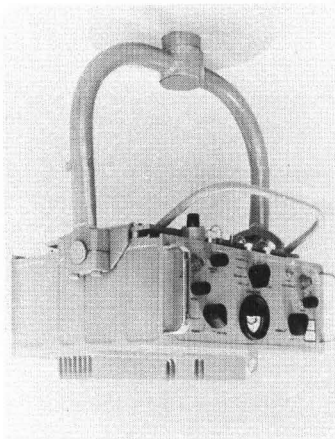
# Communications Sciences Division



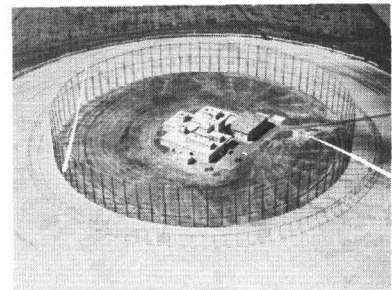
*SIGNAL PROCESSING ELEMENT*

- INFORMATION SCIENCES AND SYSTEMS
- COMMUNICATION SYSTEMS
- SYSTEMS INTEGRATION AND INSTRUMENTATION
- SATELLITE COMMUNICATION
- ELECTROMAGNETIC PROPAGATION
- SIGNAL EXPLOITATION
- INFORMATION PROCESSING SYSTEMS

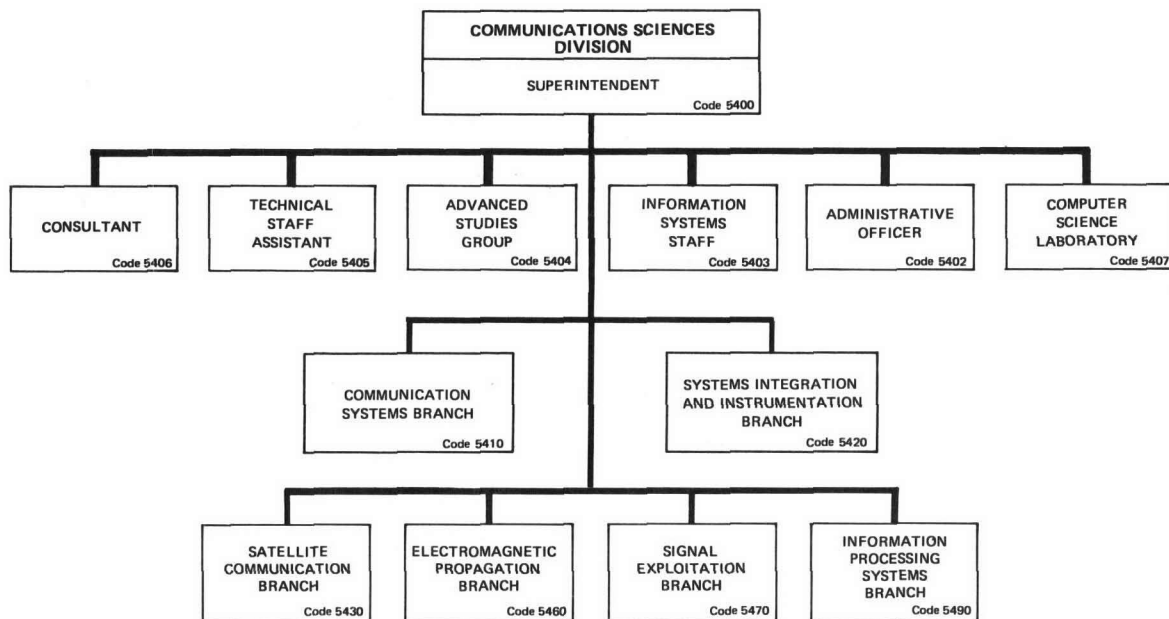
*MICROWAVE SPACE RESEARCH FACILITY*



*K<sub>A</sub>-BAND TRANSCEIVER*



*HF ANTENNA*



## Basic Responsibilities

The Communications Sciences Division conducts research and development in the systems, sensors, techniques, instrumentation and phenomenology of communications, signal exploitation, and information processing. The major emphasis is placed on those new concepts and techniques that will specifically enhance the Navy's capabilities in the collection, processing, transmission, and distribution of information.

### Staff Activity

<u>Computer Science Laboratory</u>	<u>Information Systems Staff</u>
Intelligent systems	System architecture
Clustering and pattern recognition	Information management
Heuristics	Software engineering

### Branches

<u>Communication Systems</u>	<u>Satellite Communication</u>
Submarine communication systems	Satellite communication systems
Antenna and rf distribution systems	Modem and processor studies
Underwater reception	Anti-jam and LPI technology
<u>Systems Integration and Instrumentation</u>	<u>Electromagnetic Propagation</u>
Precise frequency and time	ULF and LF propagation research
Secure communication systems	Noise background investigations
Source data and channel encoding	ELF sub-systems
<u>Signal Exploitation</u>	<u>Information Processing Systems</u>
Radio frequency intercept and signal processing	High-performance signal processors
Direction finding and position location	Computer family architecture
Signal storage and display	Signal processing language

### Key Personnel

<u>Name</u>	<u>Title</u>
Dr. B. Wald	Superintendent
Mrs. Carole E. Holt	Administrative Officer
LCDR N.L. Wardle	Consultant
Mr. M.L. Musselman	Technical Staff Assistant
Dr. J.E. Shore*	Head, Information Systems Staff
Dr. J.R. Slagle	Head, Computer Science Laboratory
Mr. C.V. Parker	U.S. Leader to the IFF Panel of the NATO Defense Research Group
Dr. W.S. Ament	Advanced Studies Group
Mr. H.D. Cabbage	Head, Communication Systems Branch
Mr. D.I. Himes	Head, Systems Integration and Instrumentation Branch
Mr. J.P. Leiphart	Head, Satellite Communication Branch
Mr. W.E. Garner	Head, Electromagnetic Propagation Branch
Mr. R.D. Misner	Head, Signal Exploitation Branch
Mr. Y.S. Wu	Head, Information Processing Systems Branch

### Personnel Complement

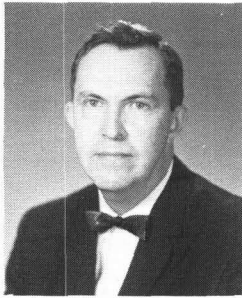
On Board: 186

Total Estimated R&D Funding

Fiscal Year 1975: \$17,000,000

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\*Acting

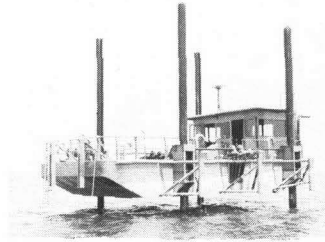


Dr. L. F. Drummeter, Jr.

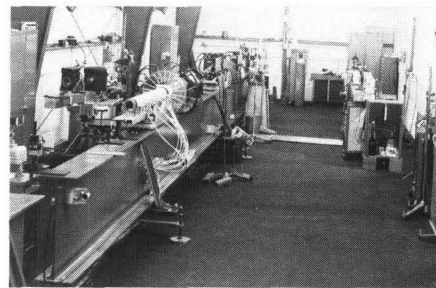
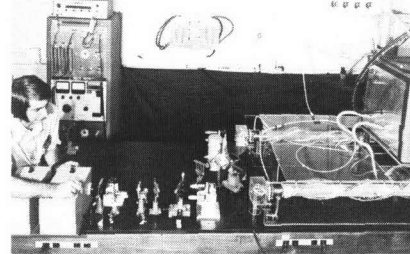
# Optical Sciences Division

- OPTICAL PHYSICS
- INTERACTION PHYSICS
- APPLIED OPTICS
- LASER PHYSICS
- OPTICAL WARFARE
- OPTICAL RADIATION

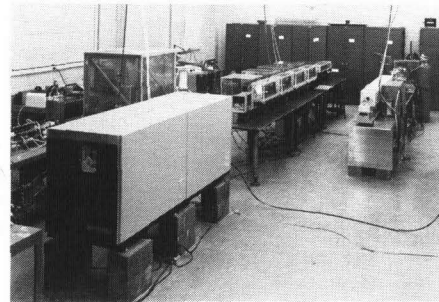
JACK-UP BARGE AT CBD



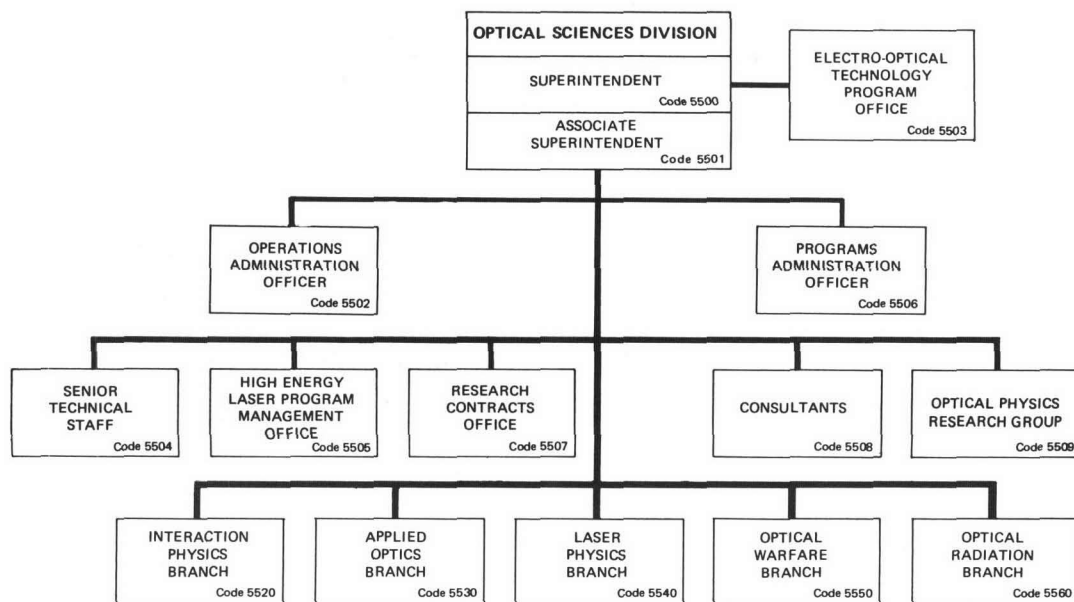
FOUR-WAVE INFRARED MIXING EXPERIMENT



GLASS LASER



CO<sub>2</sub> PULSE LASER



## Basic Responsibilities

The Optical Sciences Division carries out a variety of research, development, and application-oriented activities in the generation, propagation, detection, and use of radiation in the wavelength region between near ultraviolet and far infrared. The research, both theoretical and experimental, is concerned with discovering and understanding the basic physical principles and mechanisms involved in optical devices and phenomena. The development effort is aimed at extending this understanding in the direction of device engineering and advanced operational techniques. The applications activities include systems analysis and prototype system development and exploitation of research and development for the solution of optically related military problems. In addition to its internal program activities, the Division serves the Laboratory specifically and the Navy generally as a consulting body of experts in optical sciences and focuses some of this effort through the Electro-Optical Technology Program Office. The work in the Division includes studies in quantum optics, laser physics, laser-matter interactions, atmospheric propagation, optical technology, holography, optical warfare, optical radar, and optical systems. A variety of field measurement programs on optical problems of specific interest are also conducted.

## Staff Activities

<u>Electro-Optical Technology Program Office</u>	<u>Senior Scientific and Consultant Staff</u>
Electro-optical program assessment and advisory support	Special systems analysis Technical study groups Technical contract monitoring

## Branches

<u>Optical Physics</u>	<u>Optical Radiation</u>
Nonlinear optical phenomena Picosecond light pulses Light scattering in solids Nonlinear effects in materials Optical waveguides Liquid crystals	Laser system engineering Electro-optic applications Optical instrumentation Interferometry Systems operation Atmospheric optics Propagation studies
<u>Interaction Physics</u>	<u>Laser Physics</u>
Laser controlled fusion Laser x-ray generation X-ray lasers Laser-matter interactions High-power glass laser development	Molecular laser physics Chemical laser physics Electrically driven lasers
<u>Optical Warfare</u>	<u>Applied Optics</u>
Optical and IR countermeasures Optical intelligence Optical and electro-optical techniques	Optical intelligence Optical characteristics of military targets Optical technology

## Key Personnel

<u>Name</u>	<u>Title</u>
Dr. L.F. Drummeter, Jr.	Superintendent
Mrs. Thelma E. Garber	Associate Superintendent
	Operations Administration Officer
Dr. J.M. MacCallum, Jr.	Head, Electro-Optical Technology Program Office
Dr. H.W. Gandy	Deputy Head, Electro-Optical Technology Program Office
Mr. O.C. Barr	Liaison Representative to MAT-03
LCDR L. Brown	Senior Technical Staff (assigned to ASWE, England)
Dr. R.C. Elton	Senior Technical Staff
Dr. F. Milton	Senior Technical Staff
Dr. H. Shenker	Senior Technical Staff
Mr. L.E. Triggs	Senior Technical Staff
Dr. W.L. Faust	Senior Technical Staff
Dr. R.A. Andrews	Head, Interaction Physics Branch
Dr. R.A. Patten	Head, Applied Optics Branch
Dr. R. Airey	Head, Laser Physics Branch
Mr. J.R. Anderson	Head, Optical Warfare Branch
Dr. P.M. Livingston	Head, Optical Radiation Branch

## Personnel Complement

On Board: 137

Total Estimated R&D Funding

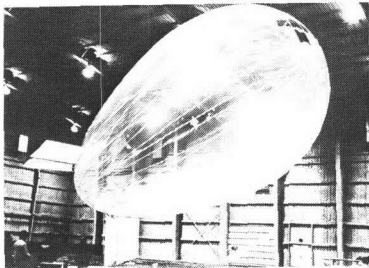
Fiscal Year 1975: \$12,900,000



Mr. L. A. Cosby

# Tactical Electronic Warfare Division

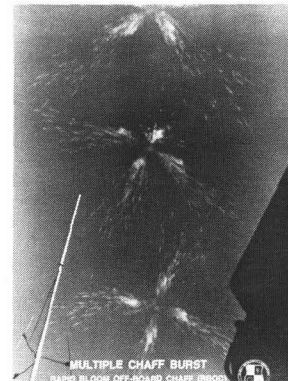
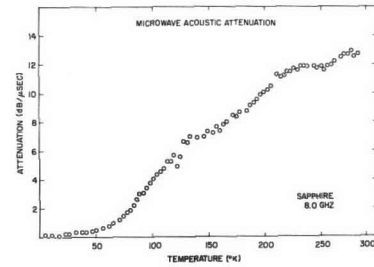
P-180—INTEGRATED ELECTROMAGNETIC TEST AND ANALYSIS LABORATORY



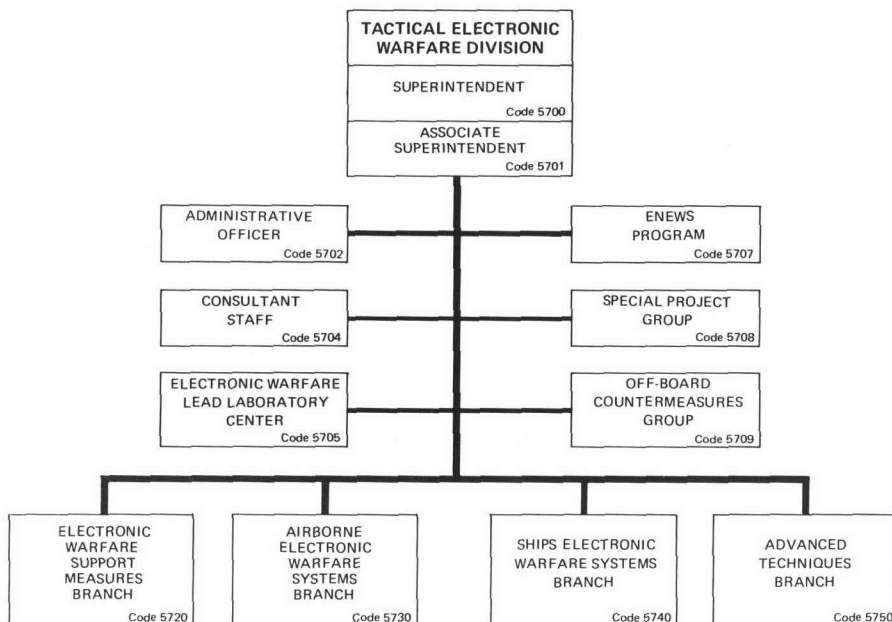
HIGH PLATFORM

- LEAD LABORATORY CENTER
- EFFECTIVENESS OF NAVAL EW SYSTEM (ENEWS)
- SPECIAL PROJECT
- OFF-BOARD COUNTERMEASURES
- ELECTRONIC WARFARE SUPPORT MEASURES
- AIRBORNE ELECTRONIC WARFARE SYSTEMS
- SHIPS ELECTRONIC WARFARE SYSTEMS
- ADVANCED TECHNIQUES

MICROWAVE ACOUSTIC RESEARCH



MULTIPLE CHAFF BURST  
RAPID BLOOD OFF-BOARD CHAFF (RBCO)



## Basic Responsibilities

The Tactical Electronic Warfare Division is responsible for research and development in support of the Navy's tactical electronic warfare requirements and missions. These include electronic warfare support measures, electronic countermeasures, supporting counter-countermeasures, as well as study, analyses, and simulations for the determination and improvement of the effectiveness of these systems.

### Staff Activities

<u>Lead Laboratory Coordinating Staff</u>	<u>ENEWS</u>
Navy in-house exploratory development	EW effectiveness
Program reference center	Simulation analysis and measurement
Advanced Technical Objectives Working Group	<u>Special Project Group</u>
Analyses and liaison	Vulnerability analysis
<u>Off-Board Countermeasures Group</u>	Special countermeasures
Expendables technology	
Expendable devices	

### Branches

<u>Airborne Electronic Warfare Systems</u>	<u>Electronic Warfare Support Measures</u>
Air systems development	Intercept systems
Penetration aids	Direction finding
Power source development	Systems integration
<u>Ships Electronic Warfare Systems</u>	Command and control interfaces
Ships systems development	<u>Advanced Techniques</u>
Jamming technology	Analysis and modeling simulation
Deception techniques	New EW techniques
EW antennas	Experimental systems
Simulators	EW concepts

### Key Personnel

<u>Name</u>	<u>Title</u>
Mr. L.A. Cosby	Superintendent
Dr. G.P. Ohman	Associate Superintendent
Miss Gertrude Batchelder	Administrative Officer
Mr. M.J. Sheets	Lead Laboratory Coordinator and Head, Electronic Warfare Lead Laboratory Center
Mr. D.F. Grady	Manager, ENEWS Program
Mr. L.A. Cosby	Program Manager, Special Project
Mr. N.J. Lesko*	Deputy Program Manager, Special Project
Mr. J.A. Montgomery*	Head, Off-Board Countermeasures Group
Mr. H.W. Zwack	Head, Electronic Warfare Support Measures Branch
Dr. G.P. Ohman*	Head, Airborne Electronic Warfare Systems Branch
Mr. C.S. Bender*	Head, Ships Electronic Warfare Systems Branch
Dr. G.E. Freidman	Head, Advanced Techniques Branch

### Personnel Complement

On Board: 156

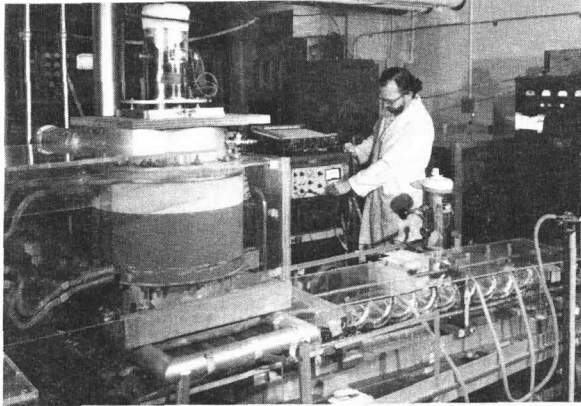
Total Estimated R&D Funding

Fiscal Year 1975: \$15,000,000

\*Acting

## Materials and General Sciences Area

The Materials and General Sciences Area is an administrative grouping of chemists, metallurgists, and solid-state, optical, and nuclear scientists who (a) carry on interdisciplinary basic and applied research on the mechanical, electrical, thermal, magnetic, optical, and nuclear properties of matter, and (b) develop components, devices, and systems based on the phenomena and principles of the several disciplines involved.



## Associate Director of Research for Materials and General Sciences



Dr. Albert I. Schindler\*

Dr. Schindler [REDACTED] He received the degrees of B.S. (1947), M.S. (1948), and D.Sc. (1950), all in physics, from Carnegie Institute of Technology.

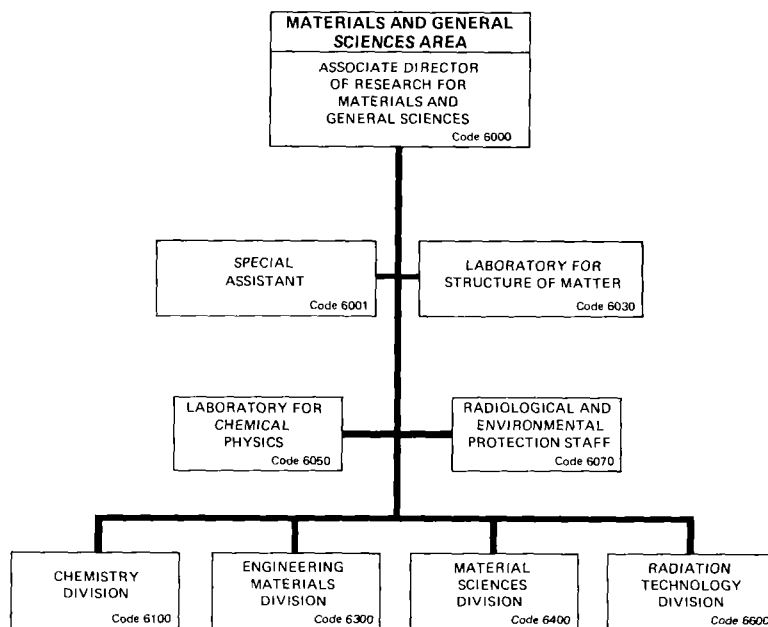
He came to the Naval Research Laboratory in 1951 and has, as Head, Metal Physics Branch, Material Sciences Division, conducted and directed research on the physical properties of metallic alloys. Dr. Schindler has authored or co-authored over 90 papers in solid state physics on topics including galvanomagnetic effects in alloys, electronic specific heat of transition metals, and irradiation effects in magnetic materials. In this latter area, he holds several patents. He is an Adjunct Professor of Physics at Howard University, and has supervised thesis research there as well as at Catholic University, the University of Maryland, and American University. During a sabbatical year, Dr. Schindler was a visiting scientist at Imperial College of Science and Technology in London, England.

For his distinguished research Dr. Schindler has received numerous awards including the E. O. Hulbert Science Award for 1956, the National Capital Award in Applied Science for 1962, the 1965 Pure Science Award of the NRL Branch of the Scientific Research Society of America and the 1966 Award for Scientific Achievement presented by the Washington Academy of Science, and the Distinguished Achievement in Science Award, April 1975.

Dr. Schindler is a fellow of the American Physical Society and of the Washington Academy of Sciences. He also is a member of the Philosophical Society of Washington and of Sigma Xi, the Scientific Research Society of North America. In this latter organization, Dr. Schindler has been a member of the Board of Directors since 1974.

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\*Acting



### Key Personnel

<u>Name</u>	<u>Title</u>
Dr. A.I. Schindler*	Associate Director of Research for Materials and General Sciences
Dr. D.A. Patterson	Special Assistant
Dr. J. Karle	Chief Scientist, Laboratory for Structure of Matter
Dr. W.A. Zisman	Chief Scientist, Laboratory for Chemical Physics
Mr. L.A. Brauch	Head, Radiological and Environmental Protection Staff
Dr. R.E. Kagarise	Superintendent, Chemistry Division
Mr. L.E. Steele*	Superintendent, Engineering Materials Division
Dr. C.C. Klick	Superintendent, Material Sciences Division
Dr. J. McElhinney	Superintendent, Radiation Technology Division

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\*Acting

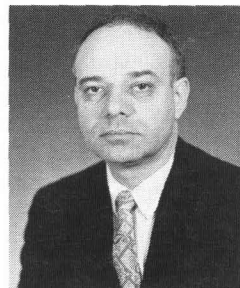
# LABORATORY FOR STRUCTURE OF MATTER

## Basic Responsibilities

The Laboratory for Structure of Matter carries out experimental and theoretical investigations of the atomic, molecular, glassy, and crystalline structures of materials. The methods of x-ray, electron, and neutron diffraction are used in a broad program of structure studies which can form the basis for understanding and interpreting the results of research investigations in a wide variety of scientific disciplines.

## Key Personnel

<u>Name</u>	<u>Title</u>
Dr. J. Karle	Chief Scientist, Laboratory for Structure of Matter



Dr. J. Karle

## Personnel Complement

On Board: 11

## Total Estimated R&D Funding

Fiscal Year 1975: \$500,000

# LABORATORY FOR CHEMICAL PHYSICS

## Basic Responsibilities

The Laboratory for Chemical Physics carries out an interdisciplinary program of fundamental and applied research with especial emphasis on phenomena occurring at phase boundaries, i.e., the interfaces between solids and solids, solids and liquids, solids and gases, liquids and liquids, and liquids and gases. Currently, attention is being given to adhesion and adhesion promoters, wetting and spreading of liquids on solids including liquid metals and ceramics, surface electric properties of metals and plastics, interfacial phenomena in composite materials, the quantitative relation of dry film lubricants to shear strength and its pressure coefficient, the ability of insoluble monolayers to dampen capillary waves on liquids, the relation of interfacial properties to various aspects of blood clotting and bioadhesion.

## Key Personnel

<u>Name</u>	<u>Title</u>
Dr. W.A. Zisman	Chief Scientist, Laboratory for Chemical Physics



Dr. W. A. Zisman

## Personnel Complement

On Board: 5

Total Estimated R&D Funding

Fiscal Year 1975: \$180,000

# RADIOLOGICAL AND ENVIRONMENTAL PROTECTION STAFF

## Basic Responsibilities

The Radiological & Environmental Protection Staff is assigned the responsibility for radiological safety and the overall minimization of pollution from all sources at NRL and its field stations. The NRL radiological protection program has three primary purposes: (1) to assure that all operations using ionizing and microwave radiation are safe and in compliance with Federal Regulations; (2) to provide employees with instruments, instructions, and assistance to assure radiological safety in the performance of their duties; and (3) to conduct research in radiation dosimetry, instrumentation, and methodology. The environmental control responsibilities are to: (1) review programs to identify sources of pollution at NRL; (2) recommend preventative or corrective measures necessary to reduce or eliminate pollution; (3) monitor the air and water to determine compliance with pertinent Federal or Navy Rules and Regulations.

## Key Personnel

<u>Name</u>	<u>Title</u>
Mr. L.A. Brauch	Head, Radiological & Environmental Protection Staff
Mr. T.L. Johnson	Head, Research Section
Mr. R.B. Luersen	Head, Accelerators & Analysis Section
Mr. J.N. Stone	Head, Pollution Control Section



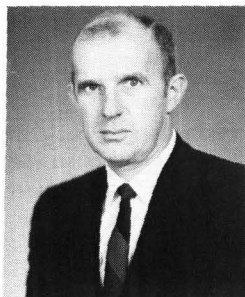
Mr. L. A. Brauch

## Personnel Complement

On Board: 16

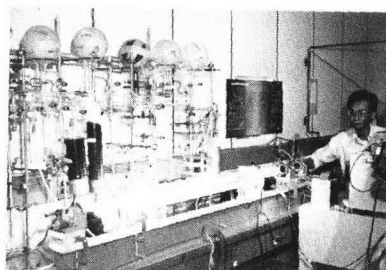
## Total Estimated R&D Funding

Fiscal Year 1975: \$441,000



Dr. R. E. Kagarise

# Chemistry Division

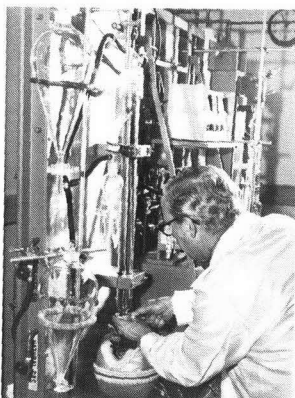


CHEMICAL LASER

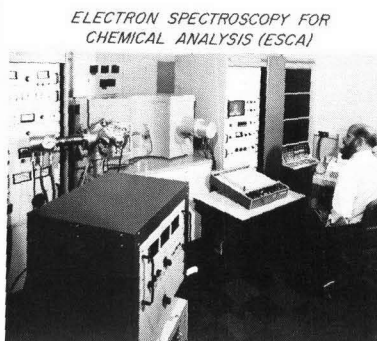


FIRE SUPPRESSION

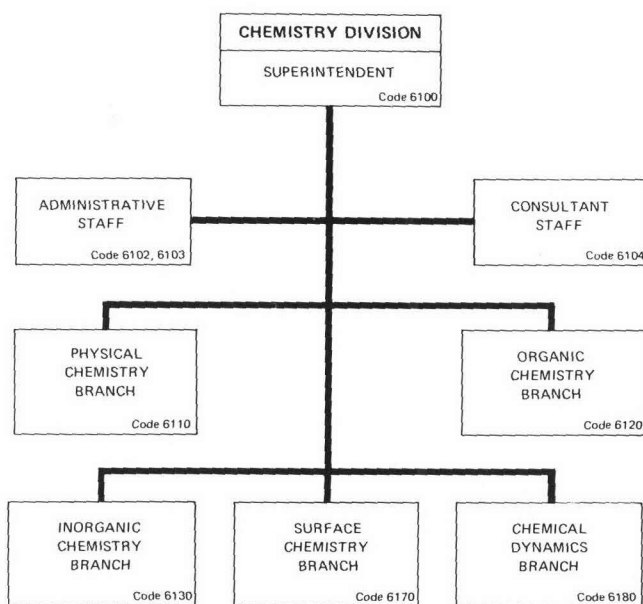
- PHYSICAL CHEMISTRY
- ORGANIC CHEMISTRY
- INORGANIC CHEMISTRY
- ELECTROCHEMISTRY
- SURFACE CHEMISTRY
- CHEMICAL DYNAMICS



CHEMICAL SYNTHESIS



ELECTRON SPECTROSCOPY FOR  
CHEMICAL ANALYSIS (ESCA)



## Basic Responsibilities

The Chemistry Division conducts a diversified research and development program in the general areas of physical, organic, inorganic and analytical chemistry. Specialized technological programs within these fields include polymeric materials (protective coatings, composites, drag reducing agents, adhesives, and high temperature lubricants), advanced inorganic fluids, fuel technology and combustion, fire suppression, chemical lasers, electrochemical power sources, and atmosphere analysis and control (mainly in nuclear submarines).

## Branches

### Physical Chemistry

- Applications of spectroscopic techniques
- Kinetics of gas phase reactions
- Chemical lasers and energy transfer
- Trace analysis

### Organic Chemistry

- Synthesis of unique polymers
- Functional organic coatings
- High strength composites
- Photophysical processes in polymers
- Gas phase organic reactions
- Thermal and oxidative degradation

### Inorganic Chemistry

- Submarine air purification
- Solid state chemistry
- Synthesis of novel inorganic compounds
- Corrosion prevention

### Surface Chemistry

- Lubricants
- Surface properties of fibers
- Adhesion and structural adhesives
- Surface and solid kinetics
- Drag reduction
- Fundamental electrode reactions
- Electrochemical power sources

### Chemical Dynamics

- Atmosphere analysis and control
- Distillate fuels research
- Autoxidation and combustion dynamics
- Fire suppression
- Personnel protection in fires

## Key Personnel

<u>Name</u>	<u>Title</u>
Dr. R.E. Kagarise	Superintendent
Dr. R.B. Lockhart, Jr.	Associate Superintendent
Mrs. Bettye C. Foster	Administrative Officer
Dr. F.E. Saalfeld	Head, Physical Chemistry Branch
Dr. L.B. Lockhart, Jr.	Head, Organic Chemistry Branch
Dr. W.B. Fox	Head, Inorganic Chemistry Branch
Dr. N.L. Jarvis	Head, Surface Chemistry Branch
Dr. H.W. Carhart	Head, Chemical Dynamics Branch

## Personnel Complement

On Board: 105

## Total Estimated R&D Funding

Fiscal Year 1975: \$5,200,000



Mr. L. E. Steele

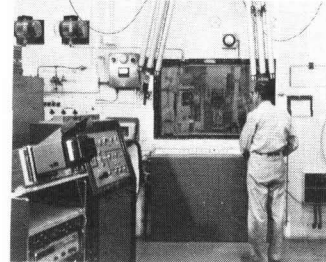
# Engineering Materials Division

- MICROMECHANICAL CRITERIA
- CERAMICS AND GLASS MATERIALS
- STRENGTH OF METALS
- THERMOSTRUCTURAL MATERIALS

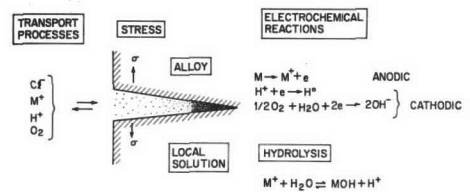
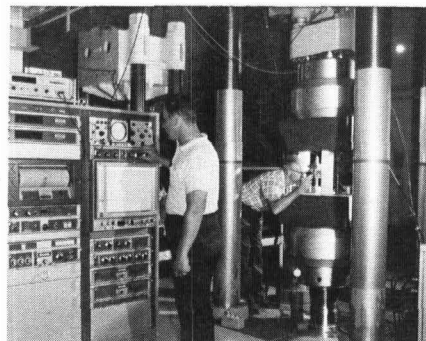


MICRO-PROCESSES OF FRACTURE

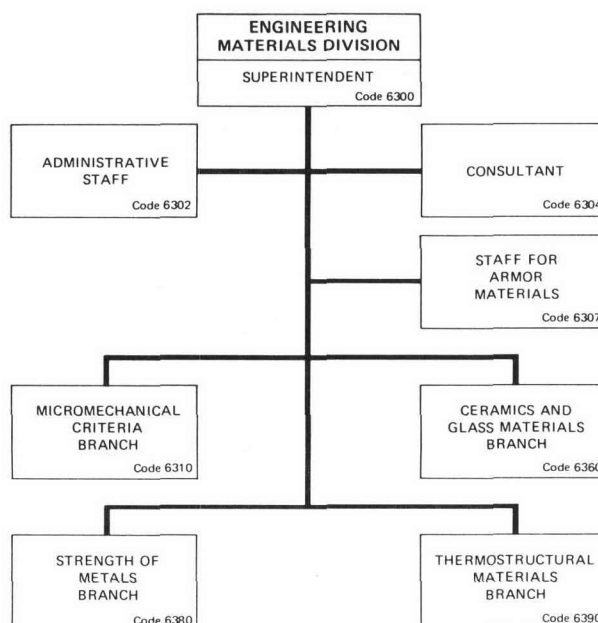
REMOTE HANDLING ROOM



LOW-CYCLE FATIGUE



ELECTROCHEMISTRY OF STRESS-CORROSION CRACKING



## Basic Responsibilities

The Engineering Materials Division is concerned with basic and applied research in the advanced characterization and development of materials for Naval structures and devices. Emphasis is given to the effects of composition, processing, and microstructure on the service performance of metals, alloys, ceramics, and composites, particularly the strength and fracture behaviors of these materials in benign, corrosive and radiation environments. Analytical considerations range from engineering reliability procedures to mechanistic modeling of microseparation processes. Other interests include thermomechanical shock response, high-temperature effects and equation-of-state, ballistic phenomena, and piezoelectric applications. This diversity of activities is carried out by an interdisciplinary staff of material scientists, metallurgists, ceramists, physicists, chemists and engineers, utilizing the most advanced testing and diagnostic facilities.

### Branches

#### Armor Materials

- Develops ballistic assessment techniques
- Penetration mechanisms
- Fragment simulation
- Materials development

#### Micromechanical Criteria

- Microstructural characterization
- Weldability of advanced alloys
- Thermomechanical effects
- Micromechanisms of crack growth
- Multiphase equation-of-state

#### Ceramic and Glass Materials

- Processing and fabrication
- Microstructural development and characterization
- Strength and fracture behavior
- Plastic deformation; study and application
- Ceramics for electronic piezoelectric optical and other nonmechanical applications

#### Strength of Metals

- Crack growth and fracture characterization criteria
- Failure-safe design parameters
- Metallurgical optimization for high-strength metals
- Macroscale and microscale aspects of metal separation processes
- Corrosion science related to advanced alloys
- Marine corrosion and cathodic protection

#### Thermostructural Materials

- Elevated temperature behavior of materials
- Influence of environment (including radiation) on high temperature materials
- Basic mechanisms of radiation damage
- Criteria for improved structural design using high temperature materials

### Key Personnel

<u>Name</u>	<u>Title</u>
Mr. L.E. Steele*	Superintendent
Mrs. Elizabeth J. Elwell	Administrative Officer
Mr. D.I. Walter	Consultant
Dr. R. Hettche	Head, Micromechanical Criteria Branch
Mr. R.W. Rice	Head, Ceramics and Glass Materials Branch
Mr. R.J. Goode	Head, Strength of Metals Branch
Mr. L.E. Steele	Head, Thermostructural Materials Branch

### Personnel Complement

On Board: 85

### Total Estimated R&D Funding

Fiscal Year 1975: \$4,400,000

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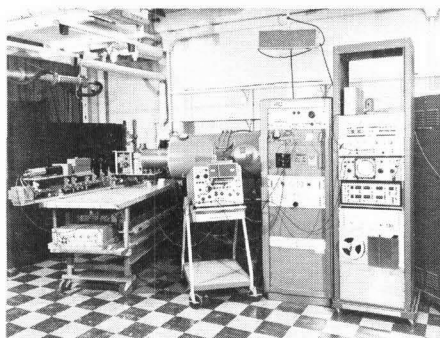
\*Acting



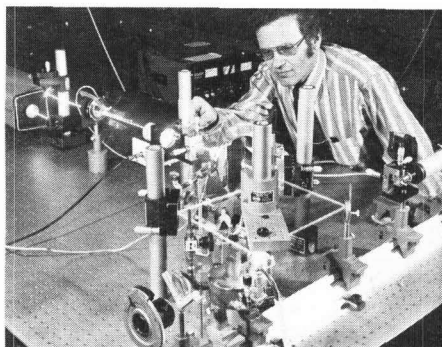
Dr. C. C. Klick

# Material Sciences Division

*EXPERIMENT FOR  
NANOSECOND IRRADIATION  
OF MATERIALS AND TRANSIENT  
OPTICAL MEASUREMENTS*

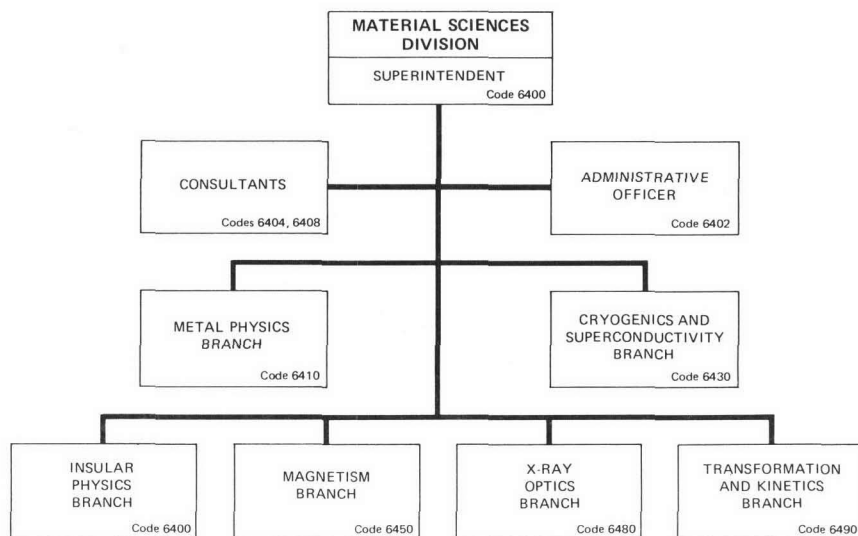
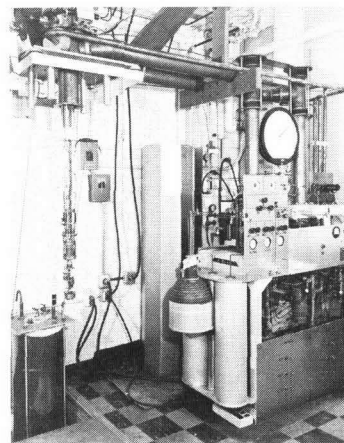


- METAL PHYSICS
- CRYOGENICS AND SUPERCONDUCTIVITY
- INSULAR PHYSICS
- MAGNETISM
- X-RAY OPTICS
- PHASE TRANSFORMATIONS
- ELASTICITY AND PLASTICITY



*DILUTION REFRIGERATOR  
WITH DIAMOND ANVIL  
PRESSURE CELL*

*HALOGRAPHY SET-UP  
WITH PHOTODICHROIC  
MATERIALS*



## Basic Responsibilities

The Material Sciences Division conducts basic and applied research and engages in exploratory and advanced development of broad categories of materials having substantive scientific and technological interest to the Navy. Programs are pursued on interesting and important resistive, superconducting, insulating, and magnetic materials, with investigations on all levels from the quantum mechanical to the microstructural. Exploitable phenomena in materials such as phase transformations, lattice defects, x-ray production, and interactions with magnetic, electromagnetic, thermal, and radiation fields are of interest and under investigation by various groups within the Division. Representative of current divisional programs are: interactions and responses of materials with lasers, magnetic and photochromic memories in solids, glass-fiber optical materials, superconducting power resonators, ultra-sensitive magnetic detectors, submarine magnetization, x-rays for environmental monitoring, and eutectic solidification for high-temperature environments in aircraft engines.

## Branches and Facilities

### Metal Physics

Electronic and magnetic properties  
Thermal and optical properties  
Laser material interactions  
Optical radiation vulnerability  
Magnetostriiction  
Advanced structural materials

### Cryogenics and Superconductivity

High-pressure effects  
Superconducting materials  
Superconducting electronics

### Insulator Physics

Electronic properties of nonmetallic crystals and glasses  
Radiation induced defects, color centers  
Optical properties: fibers, windows, data processing materials

### Magnetism

Resonance in magnetic materials  
Spin-ordered magnetic phenomena  
Rare earth — transition metal magnetic materials  
Magnetic properties of amorphous materials

### X-Ray Optics

X-ray spectrochemical analysis  
X-ray diffraction  
Band structure and superconductivity  
Plasma diagnostics

### Transformations and Kinetics

Phase transformations  
Crystalline defect states  
Microstructural effects in superconductors  
Diffusion theory  
Solid-liquid interfaces and transitions  
Elasticity, plasticity, mechanical phenomena

## Key Personnel

<u>Name</u>	<u>Title</u>
Dr. C.C. Klick	Superintendent
Mrs. Anne K. Hayden	Administrative Officer
Dr. H.B. Rosenstock	Consultant Staff: Theory
Dr. M. Hass	Consultant Staff: Experiment
Dr. J.T. Schriempf*	Head, Metal Physics Branch
Dr. R.A. Hein	Head, Cryogenics and Superconductivity Branch
Dr. M.N. Kabler	Head, Insulator Physics Branch
Dr. G.T. Rado	Head, Magnetism Branch
Mr. L.S. Birks	Head, X-Ray Optics Branch
Dr. M.E. Glicksman	Head, Transformations and Kinetics Branch

## Personnel Complement

On Board: 109

## Total Estimated R&D Funding

Fiscal Year 1975: \$5,756,000

\*Acting

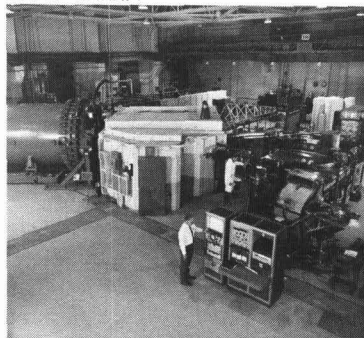


Dr. J. McElhinney

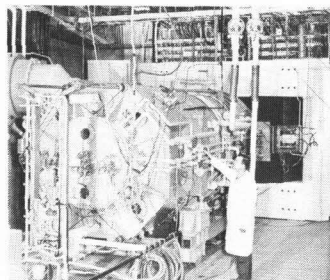
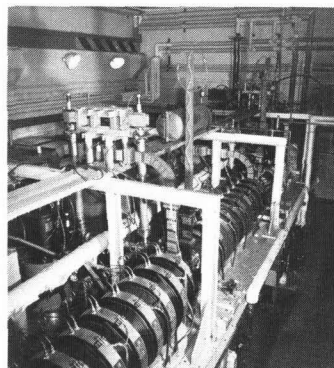
# Radiation Technology Division

- CYCLOTRON APPLICATIONS
- RADIATION EFFECTS
- ELECTRON RADIATIONS
- RADIATION THEORY
- ION BEAM APPLICATIONS

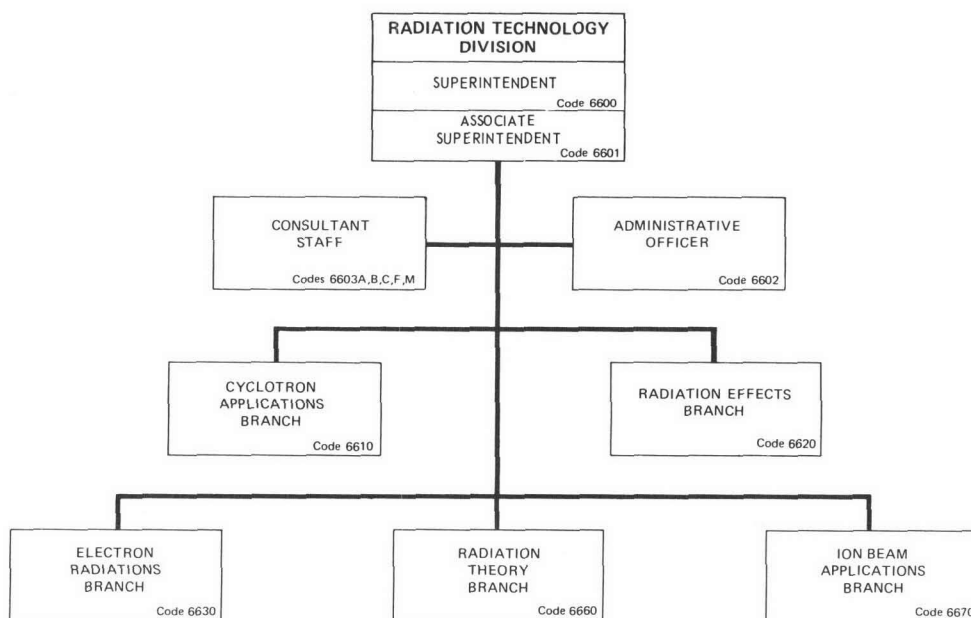
VAN DE GRAAFF



LINAC



CYCLOTRON



## Basic Responsibilities

The Radiation Technology Division is engaged in a broad program of research and development in nuclear and atomic sciences. Included are: radiation damage studies, transient radiation effects in solid state devices, materials analysis by atomic and nuclear reactions, ion implantation to modify devices and materials, neutron beams for cancer therapy, radio-isotope production, and radiation instrumentation. The Division operates a 75-MeV sector focussing cyclotron, a 60-MeV electron linear accelerator, a 5-MV Van de Graaff, and several smaller accelerators and radiation sources. A strong theoretical and experimental research effort supports the above program.

### Staff Activities

#### Consultant Staff

Radiation dosimetry  
Electromagnetic pulse effects (EMP)  
Radiations from nuclear power sources  
Radiation instrumentation

#### Branches

#### Cyclotron Applications

Charged particle nuclear reactions  
Charged particle scattering  
Neutron beams for cancer therapy  
Ion-induced x-rays  
Radioisotope production  
Radiation damage

#### Radiation Effects

Radiation effects on infrared detectors, optical and electronic materials, and satellite components  
Solar cells  
Radiation belts  
Hardening satellite components against laser beams  
Radiation curing of polymers  
2-MV-electron Van de Graaff  
Cobalt-60 source

#### Electron Radiations

Electron scattering  
Neutron capture reactions  
Transient radiation effects on electronics

#### Electron Radiations (continued)

Radioactivation analysis  
Measurement of neutrons and high-energy x-rays from pulsed sources

#### Radiation Theory

Nuclear reactions  
Nuclear structure  
Coherent bremsstrahlung  
Electron scattering by nuclei  
Neutron transport  
High-intensity laser beam propagation  
Deposition of energy by charged particles

#### Ion Beam Applications

Materials analysis by means of charged particle beams  
Implantation of ions into solids  
Radiation effects caused by high energy charged particle beams  
Crystal studies by means of particle channeling techniques  
Ion-induced x-rays

### Key Personnel

<u>Name</u>	<u>Title</u>
Dr. J. McElhinney	Superintendent
Mr. H.J. Quinn	Scientific Staff Assistant
Dr. E.A. Wolicki*	Consultant and Associate Superintendent
Mr. F.H. Attix	Consultant (Radiation Dosimetry)
Dr. J.W. Butler	Consultant (Radiation Measurements)
Mr. D.C. Cook	Consultant (Nuclear Instrumentation)
Dr. K.W. Marlow	Consultant (Nuclear Power)
Dr. R.O. Bondelid	Head, Cyclotron Applications Branch
Dr. B.J. Faraday*	Head, Radiation Effects Branch
Dr. T.F. Godlove	Head, Electron Radiations Branch
Dr. A.W. Sáenz	Head, Radiation Theory Branch
Dr. K.L. Dunning	Head, Ion Beam Applications Branch

### Personnel Complement

On Board: 96

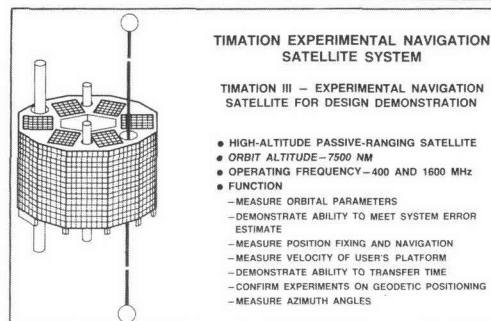
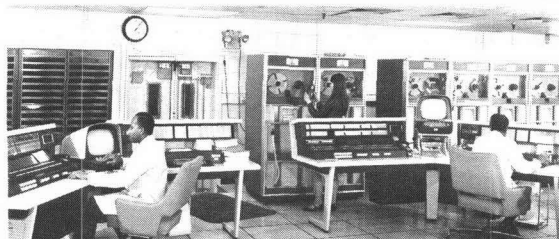
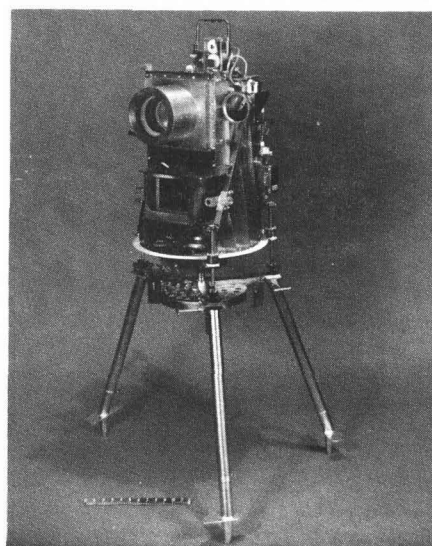
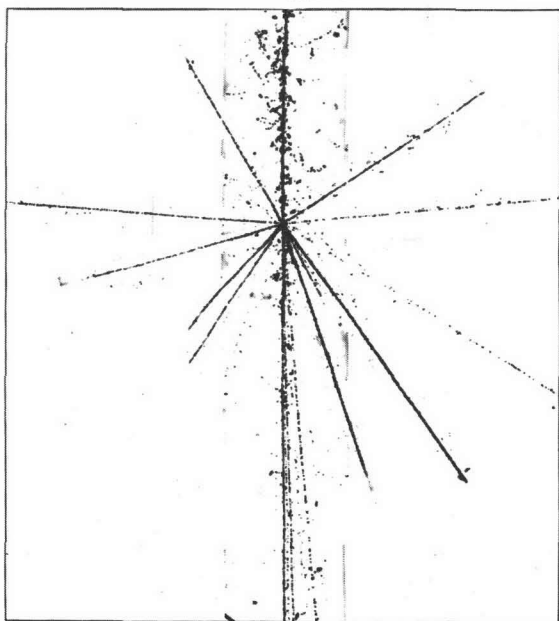
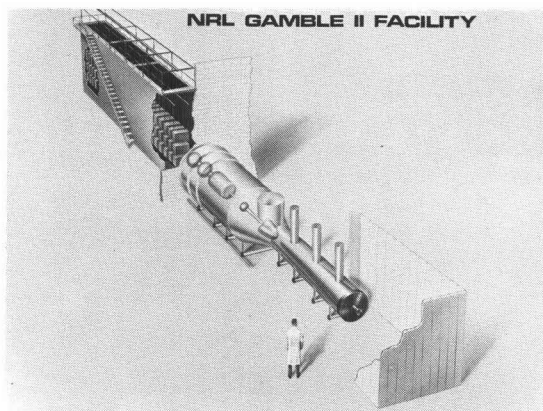
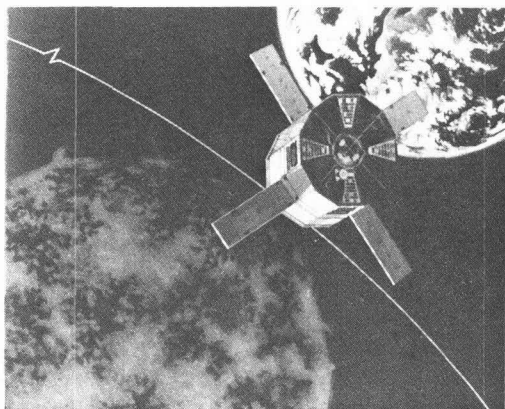
### Total Estimated R&D Funding

Fiscal Year 1975: \$4,500,000

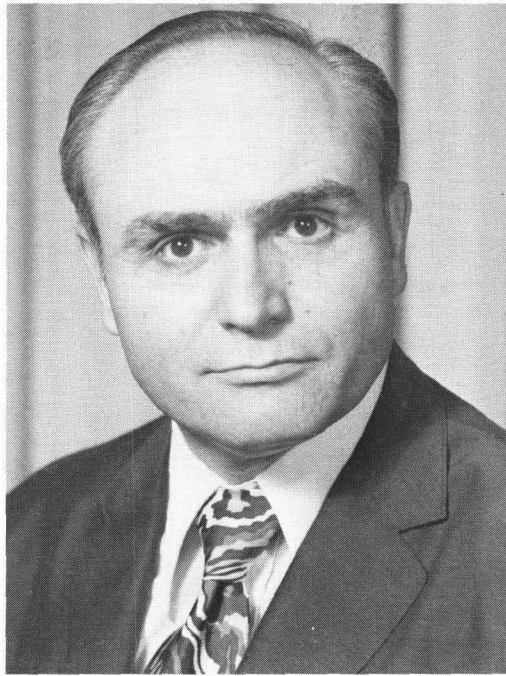
\*Acting

# Space Science and Technology Area

The Naval Research Laboratory conducts basic and applied research in upper air physics, astronomy, and astrophysics to improve naval capabilities in communications, navigation, detection, surveillance, and other fields; the investigations are made by means of several radio telescopes and a wide variety of space probes. Both experimental and theoretical techniques are used to conduct plasma research, to understand more fully natural and man-made plasma phenomena, and to develop controlled thermonuclear power sources. The area is involved also in the study and application of advanced mathematical techniques and in the many approaches afforded by the computer sciences.



## Associate Director of Research for Space Science and Technology



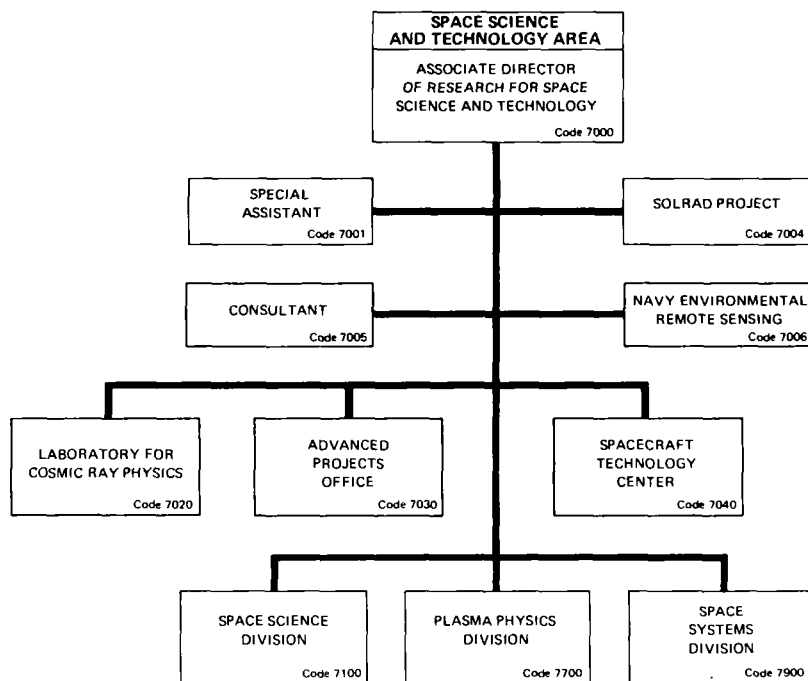
Dr. Herbert Rabin

Dr. Rabin was [REDACTED] He received a B.S. degree in physics from the University of Wisconsin in 1950, an M.S. degree in physics from the University of Illinois in 1951, and a Ph.D. degree in physics from the University of Maryland in 1959.

He has been employed at the Naval Research Laboratory since 1952, working in the fields of high-energy gamma ray and electron facilities, radiation dosimetry, solid state studies of lattice defects, and nonlinear optics and laser physics. In these research areas Dr. Rabin has authored or coauthored well over a hundred papers and conference presentations. In addition, Dr. Rabin holds five patents.

Prior to his present appointment Dr. Rabin held several supervisory positions at NRL, the most recent being Head, Quantum Optics Branch, Optical Sciences Division. He has taught courses in the Physics Department at George Washington University; he was a visiting scientist at the Technische Hochschule in Stuttgart, Germany; and he was a consultant to the school of Engineering of the University of Sao Paulo, Sao Carlos, Brazil, under sponsorship of the Pan American Union.

Dr. Rabin is a Fellow of the American Physical Society and holds membership in the Optical Society of America, the Philosophical Society of Washington, the American Association for the Advancement of Science, the American Institute of Aeronautics and Astronautics, and several honorary societies. He is also a corresponding member of the Brazilian Academy of Sciences. Dr. Rabin received the Navy Meritorious Civilian Service Award in 1969 and the E.O. Hulburt Annual Science Award for 1970.



### Key Personnel

<u>Name</u>	<u>Title</u>
Dr. H. Rabin	Associate Director of Research for Space Science and Technology
Mr. J.M. Shaw, Jr.	Special Assistant
Mr. E.W. Peterkin	Technical Project Manager
Dr. J.W. Schwartz	Consultant
Dr. V.E. Noble	Special Assistant for Navy Environmental Remote Sensing
Dr. M.M. Shapiro	Head, Laboratory for Cosmic Ray Physics
Mr. R.D. Mayo	Head, Advanced Projects Office
Mr. P.G. Wilhelm	Head, Spacecraft Technology Center
Dr. H. Friedman	Superintendent, Space Science Division
Dr. R.A. Shanny	Superintendent, Plasma Physics Division
Mr. N.W. Guinard	Superintendent, Space Systems Division

# LABORATORY FOR COSMIC RAY PHYSICS

## Basic Responsibilities

The Laboratory for Cosmic Ray Physics conducts a program of fundamental investigations of cosmic radiation — its composition and spectra, its origin, its propagation through space, its interactions with particles and fields in the regions of space that it traverses, and its role in astrophysics. Solar energetic particles constitute another major area of research. The program is framed so as to be broadly responsive to the anticipated technical requirements of the Navy and the general research and development program of the Department of Defense.

## Key Personnel

<u>Name</u>	<u>Title</u>
Dr. M.M. Shapiro	Chief Scientist, Laboratory for Cosmic Ray Physics
Mr. N. Seeman	Senior Scientist
Dr. R. Silberberg	Senior Scientist
Mr. F.W. O'Dell	Senior Scientist



Dr. M. M. Shapiro

## Personnel Complement

On Board: 16

Total Estimated R&D Funding

Fiscal Year 1975: \$600,000

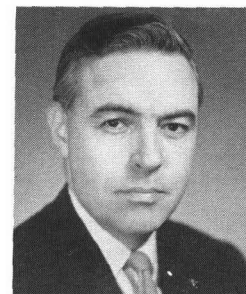
# SOLRAD PROJECT

## Basic Responsibilities

The SOLRAD Project was established to support NAVAIR exploratory development tasks in solar x-ray monitoring and specifically to (1) develop, construct, test, evaluate, and provide launch support of SOLRAD satellites; (2) track, command, and acquire satellite telemetry; and (3) reduce, analyze, and transmit solar emission data for scientific and application purposes.

## Key Personnel

<u>Name</u>	<u>Title</u>
Mr. E.W. Peterkin	Technical Project Manager
Mr. R.W. Kreplin	Scientific Program Manager
Mr. E.L. Dix	Assistant Manager for Data Processing
Mr. P.G. Wilhelm	Assistant Manager for Spacecraft
Mr. G.E. Leavitt	Technical Assistant for Experiments Electronics



Mr. E. W. Peterkin

Manpower Support: 36 man-years

Total Estimated R&D Funding

Fiscal Year 1975: \$2,455,000

# ADVANCED PROJECTS OFFICE

## Basic Responsibilities

The Advanced Projects Office is responsible for the NRL program sponsored by the NAVELEX PME-106-5/SPO. The Advanced Projects Office is responsible for all management functions of the entire NRL effort in this advanced project and provides the NRL external interface for the program.

## Key Personnel

<u>Name</u>	<u>Title</u>
Mr. R.D. Mayo	Manager, Advanced Projects Office
Mr. F. V. Hellrich	Head, Systems Development Branch
Mr. L.M. Hammarstrom	Head, Systems Engineering and Integration Branch



Mr. R. D. Mayo

## Personnel Complement

On Board: 4

## Total Estimated R&D Funding

Fiscal Year 1975: \$14,513,000

# SPACECRAFT TECHNOLOGY CENTER

## Basic Responsibilities

The Spacecraft Technology Center is responsible for providing complete spacecraft systems for purposes of conducting research and development in the space environment. This involves a broad and complete spectrum of activities ranging from system concept formulation, preliminary and detailed design, prototype development through to complete flight systems. The Center maintains all of the necessary special facilities for aerospace type fabrication and environmental testing and the expertise which is generally required in the spacecraft system. The Center also maintains dedicated ground stations for the purpose of transmitting command/control signals to, and receiving and analyzing telemetered data from, those of its spacecraft which have been placed into orbit.

## Key Personnel

<u>Name</u>	<u>Title</u>
Mr. P.G. Wilhelm	Head, Spacecraft Technology Center
Mr. A.C. Salvato	Product Design Section
Mr. R.T. Beal	Special Mechanical Systems Section
Mr. R.S. Rovinski	Satellite Structures Design Section
Mr. F.W. Raymond	Engineering Physics Section
Mr. J.G. Winkler	Power Systems Section
Mr. L.E. Hearton	R. F. Systems Section
Mr. R.E. Eisenhauer	Satellite Digital Systems Section



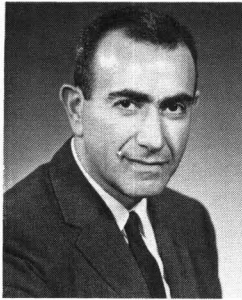
Mr. P.G. Wilhelm

## Personnel Complement

On Board: 71

## Total Estimated R&D Funding

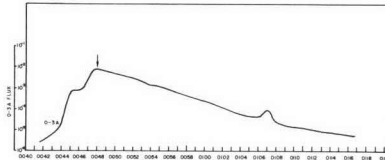
Fiscal Year 1975: \$20,044,000



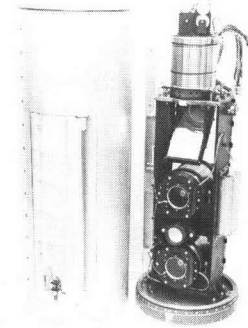
Dr. H. Friedman

# Space Science Division

ADVANCED SPACE SENSING  
APPLICATIONS  
UPPER AIR PHYSICS  
RADIO ASTRONOMY  
ROCKET SPECTROSCOPY  
• • • • •  
E.O. HULBURT CENTER FOR  
SPACE RESEARCH

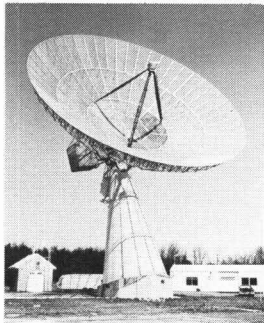


GROWTH AND DECAY OF X-RAYS  
FROM A SOLAR FLARE

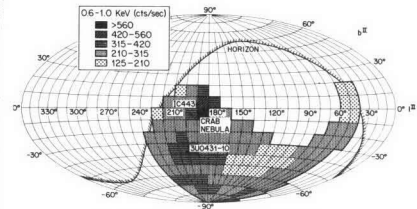


ROCKET PAYLOAD  
FOR UV OBSERVATION  
OF COMET KOHOUTEK

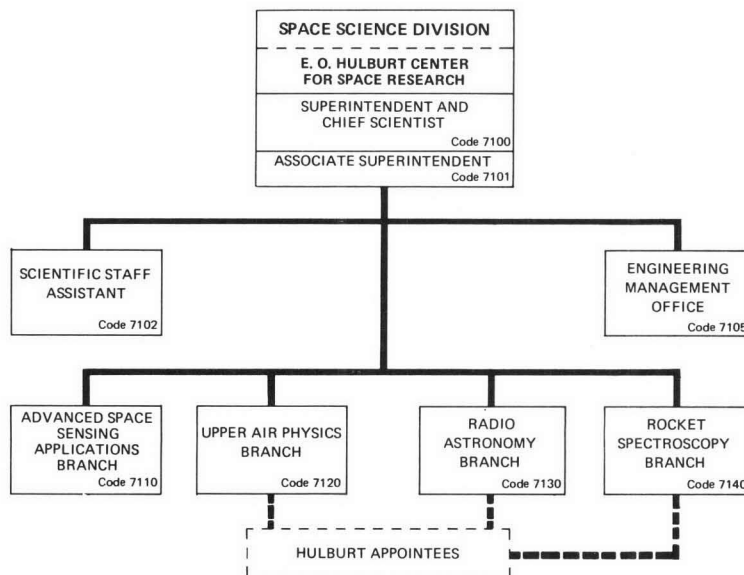
RADIO  
TELESCOPE  
MARYLAND  
POINT



FAR-ULTRAVIOLET PHOTOGRAPH OF EARTH



X-RAY INTENSITY MAP  
OF THE OBSERVED SKY



## Basic Responsibilities

The Space Science Division conducts research, development, and tests in the fields of upper air physics, astronomy, and astrophysics. Satellites and rockets are used to obtain information on radiation from the sun and celestial sources, and to study the composition and behavior of the ionosphere. Radio telescopes are used for astronomical observations. Results are of importance to radio communications, to utilization of the space environment, and to the fundamental understanding of natural radiation phenomena.

### Branches

#### Advanced Space Sensing Applications

Active and passive sensor development for remote sensing  
Satellite radar altimetry  
Remote sensing of ocean environment and surface properties  
Remote sensing of arctic conditions  
Determining volume of oil spills at sea

#### Upper Air Physics

Gamma-ray, x-ray, ultraviolet, and infrared astronomy  
Aeronomy  
Solar x-ray monitoring satellites  
Electronic imaging studies  
Meteor astronomy

#### Radio Astronomy

Galactic and extragalactic radio astronomy  
VLBI (very long basic interferometry)

#### Radio Astronomy (continued)

Intergalactic gases  
Atmospheric radiation  
Extraterrestrial radio radiation

#### Rocket Spectroscopy

X-ray and ultraviolet solar spectroscopy  
Spectroheliographic and coronagraphic research  
Laboratory astrophysics  
XUV spectroradiometry  
Apollo telescope mission solar research

#### E.O. Hulburt Center for Space Research

The program is that of the combined Upper Air Physics, Rocket Spectroscopy, and Radio Astronomy Branches. It allows graduate and postgraduate students and visiting faculty members to cooperate with NRL in space research.

### Key Personnel

<u>Name</u>	<u>Title</u>
Dr. H. Friedman	Superintendent
Dr. P. Mange	Associate Superintendent
Mr. B. Snider	Scientific Staff Assistant
Mr. B. Yaplee	Head, Advanced Space Sensing Applications Branch
Dr. T.A. Chubb	Head, Upper Air Physics Branch
Mr. C.H. Mayer	Head, Radio Astronomy Branch
Dr. R. Tousey	Head, Rocket Spectroscopy Branch
Dr. H. Friedman	Chief Scientist, Hulburt Center

### Personnel Complement

On Board: 146

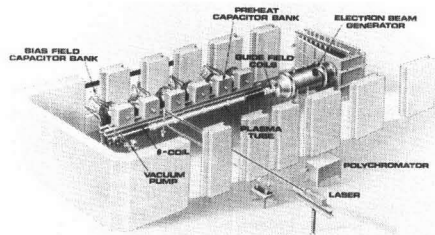
Total Estimated R&D Funding

Fiscal Year 1975: \$9,900,000

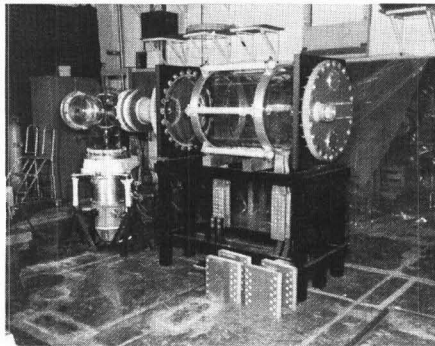


Dr. R. A. Shanny

# Plasma Physics Division

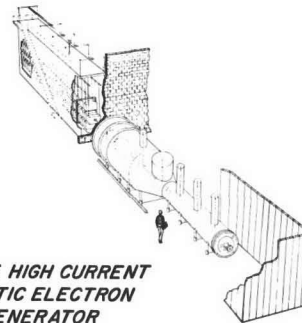


*RELATIVISTIC ELECTRON BEAM-PLASMA INTERACTION EXPERIMENT*

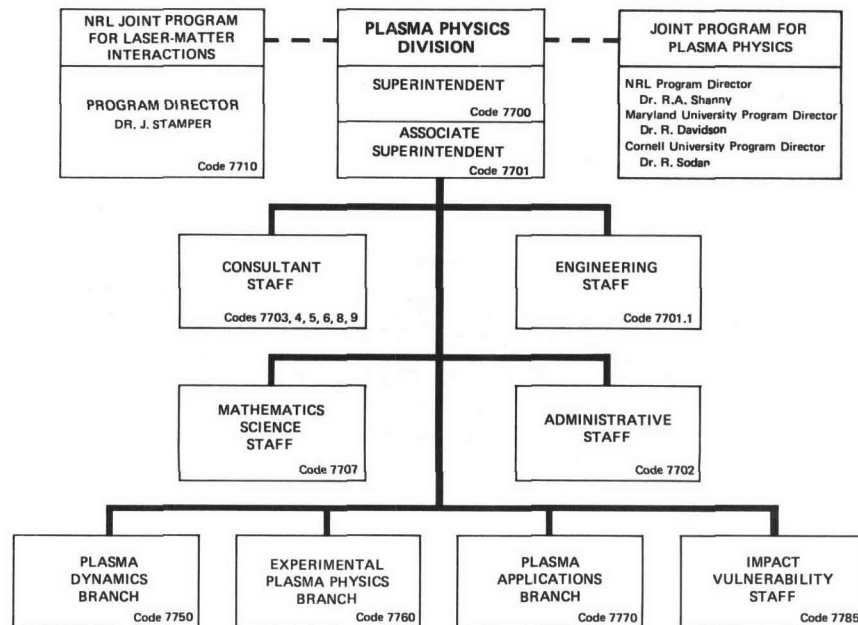


*LARGE CUSP PLASMA EXPERIMENT*

- PLASMA DYNAMICS
- EXPERIMENTAL PLASMA PHYSICS
- PLASMA APPLICATIONS
- IMPACT VULNERABILITY
- APPLIED MATHEMATICS
- IONOSPHERIC MODELING



*GAMBLE II HIGH CURRENT RELATIVISTIC ELECTRON BEAM GENERATOR*



## Basic Responsibilities

The Plasma Physics Division conducts both basic and applied experimental and theoretical research. Examples of effort underway include: fusion physics and the generation and containment of high temperature plasmas, laser produced plasmas, laboratory astrophysics, collision-free shock waves, the behavior of the ionosphere as a partial plasma, electron beam experiments, the production and effects of hypervelocity particles, and research in mathematical techniques of special interest to naval applications.

## Staff Activities

### Impact Vulnerability

Vulnerability mechanics  
Hypervelocity kill mechanism  
Hypervelocity impact mechanics

### Mathematics Techniques

Ordinary differential equations  
Approximation theory  
Stability theory  
Computer sciences  
Numerical analysis  
Optimization methods

## Branches

### Plasma Dynamics

Theoretical and numerical simulation studies  
of problems in nonlinear plasma dynamics  
Global ionospheric modelling  
Numerical simulation of high density plasmas  
Naval hydrodynamics

### Experimental Plasma Physics

Seven-ohm beam plasma experiment  
TRITON electron beam plasma  
CUSP plasma preheating experiment  
Suzy II  
Inductive energy storage  
Theory/system modelling  
LINUS  
Experimental study of plasma chemistry

### Plasma Applications

Production of intense relativistic electron  
beams  
Electron beam propagation and focussing  
Interaction of high current relativistic electron  
beams with plasmas  
Experimental research in high power exploding  
wires  
Experimental research of ultra short wave-  
length lasers  
Application of high current relativistic electron  
beams to microwave generation  
Experimental study of laser-matter interactions

## Key Personnel

<u>Name</u>	<u>Title</u>
Dr. R.A. Shanny	Superintendent
Mr. J.D. Brown	Associate Superintendent
Ms. Beverly D. Bassford	Administrative Officer
Dr. Ali	Consultant
Dr. K. Hain	Consultant
Mr. E.A. McLean	Consultant
Dr. A.E. Robson	Consultant
Dr. J.D. Shipman	Consultant
Dr. T.C. Coffey	Head, Plasma Dynamics Branch
Dr. A.E. Robson	Head, Experimental Plasma Physics Branch
Dr. L.S. Levine	Head, Plasma Applications Branch
Mr. W.W. Atkins	Head, Impact Vulnerability Staff
Dr. A.J. Skalafuris	Head, Mathematical Sciences Staff

## Personnel Complement

On Board: 126

Total Estimated R&D Funding

Fiscal Year 1975: \$8,182,000

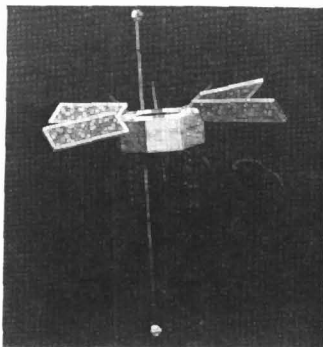


Mr. N. W. Guinard

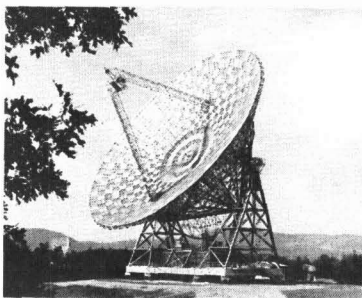
## Space Systems Division

- SPACE TECHNOLOGY
- AEROSPACE SYSTEMS
- SPACE METROLOGY
- SPACE ENVIRONMENT
- SYSTEMS RESEARCH
- ADVANCED PLANS AND PROGRAMS

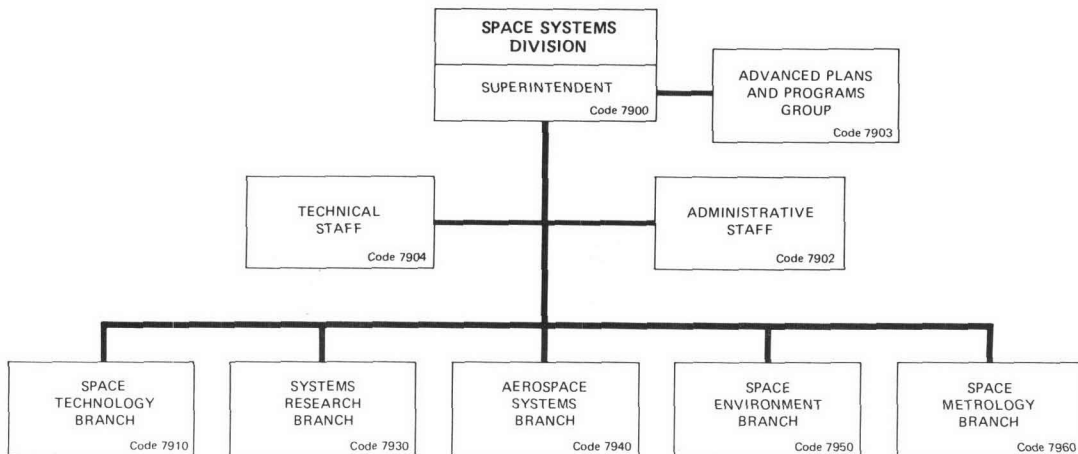
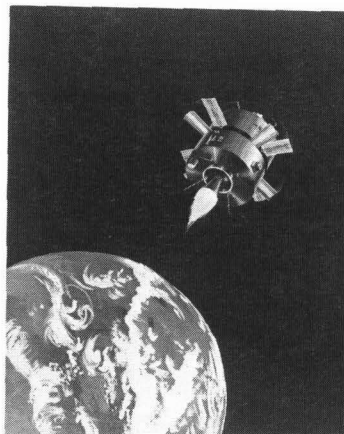
*SATELLITE  
TIMATION*



*150-FOOT  
ANTENNA  
SUGAR GROVE*



*SOLRAD HI*



## Basic Responsibilities

The Space Systems Division is responsible for research and development leading to the design, fabrication, launch, operation, and support of space systems for the Navy. The application of space technology to the naval mission extends through all of the R&D spectrum from concept formulation to launch techniques of the completed spacecraft and interface with boosters. Both active and passive sensor technology are developed for space use. The Division is also responsible for R&D in environmental problem areas which affect the operation and performance of these space vehicles and for sharing the results with other related activities.

### Staff Activity

#### Advanced Plans and Programs Group

Project support  
Systems engineering  
Systems analyses  
Data processing

### Branches

#### Space Technology

Large parabolic antenna systems  
Electromagnetic radiation observations  
Special media propagation  
Electromagnetic exosphere phenomena  
National radio quiet zone

#### Operations Research

Image processing research  
Radiative transfer  
Potential theory applications  
Space mission analysis  
Military OR methods  
Formula manipulation on computers

#### Aerospace Systems

Ocean surveillance  
Electromagnetic scatter research  
Propagation research

#### Aerospace Systems (continued)

Data systems  
Automatic computations

#### Space Environment

Space environment  
Ionospheric predictions  
Radiowave propagation  
Data processing  
Computer simulation  
Solar-terrestrial relationships

#### Space Metrology

Navigation systems  
Geodesy systems  
Time synchronization  
System analysis  
Hydrogen maser

### Key Personnel

<u>Name</u>	<u>Title</u>
Mr. N.W. Guinard	Superintendent
Mr. E.L. Dix	Acting Associate Superintendent
Mrs. Sadie M. Randleman	Administrative Officer
Mr. E.L. Dix	Head, Advanced Plans and Programs Group
Dr. K.T. Alfrend	Consultant
Dr. J.G. Foreman	Consultant
Mr. J.H. Trexler	Space Technology Branch
Dr. A.F. Petty	Systems Research Branch
Mr. E.N. Carey	Aerospace Systems Branch
Dr. J.M. Goodman	Space Environment Branch
Mr. R.L. Easton	Space Metrology Branch

### Personnel Complement

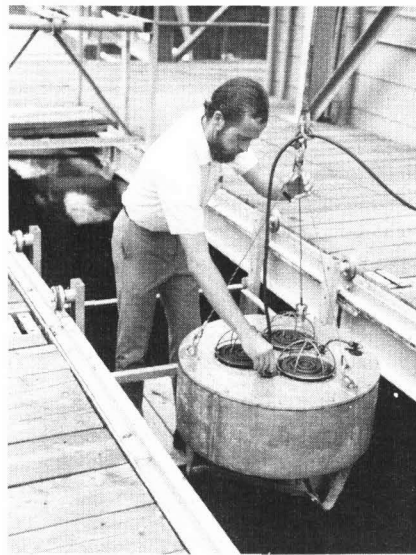
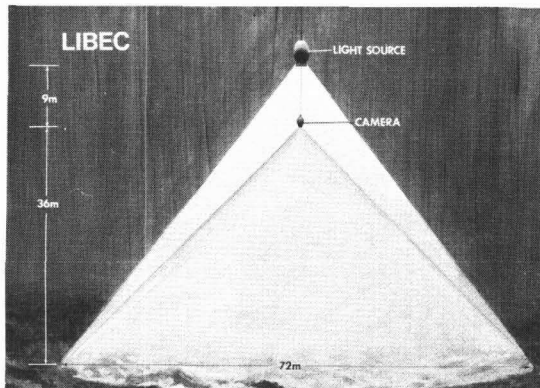
On Board: 127

### Total Estimated R&D Funding

Fiscal Year 1975: \$9,650,000

## Oceanology Area

The Naval Research Laboratory conducts research at sea and in the laboratory in the fields of underwater acoustics, oceanography, marine geophysics, atmospheric physics, and ocean engineering and technology. Subjects of investigation include antisubmarine warfare, acoustic propagation and scattering, ambient noise in the ocean, signal processing, marine and atmospheric pollution, instrumentation systems for deep ocean search and inspection, and methods of design and installation of structures and apparatus for use in the ocean. NRL also serves as a focal point in the Navy for standardization of underwater sound measurements, and it holds a major responsibility for research and development in undersea acoustic surveillance.



## Associate Director of Research for Oceanology



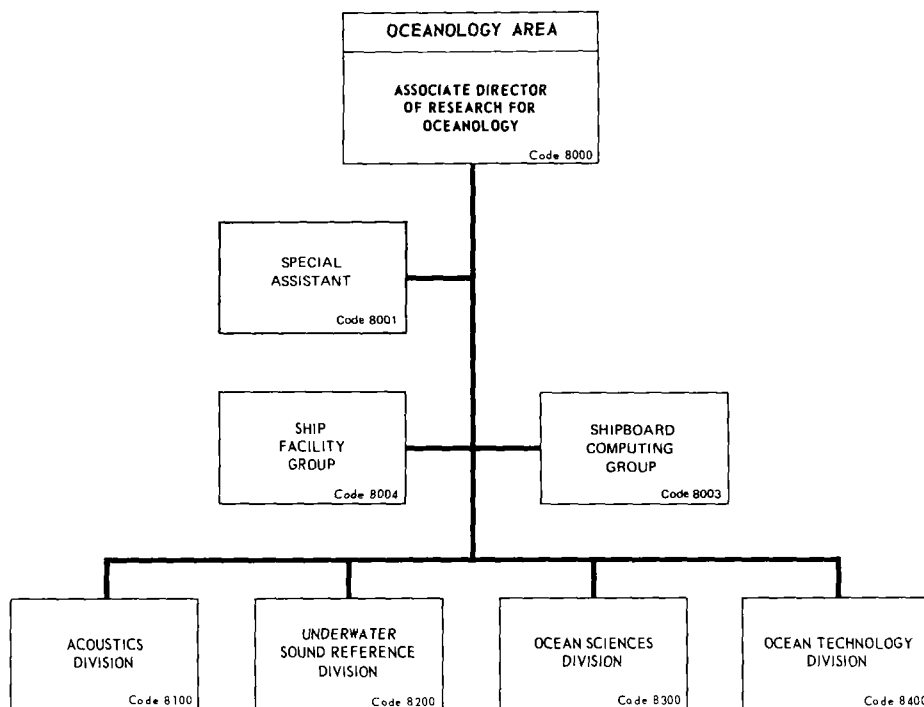
Dr. Ralph R. Goodman

Dr. Goodman was born in Detroit, Michigan, on March 18, 1927. He attended the University of Michigan, Ann Arbor, where in 1950 he received a B.S. degree in mathematics, in 1951 a B.S. in physics, in 1952 an M.S. in physics, and in 1958 a Ph.D. in physics.

He began his scientific career at the Navy Electronics Laboratory in 1958, joined the staff of Colorado State University in 1959 as Assistant Professor, and served as a consultant to the Applied Physics Group at the SACLANT ASW Research Center, La Spezia, Italy, from 1961 to 1963. He then returned to Colorado State University, where from 1963 to 1968 he served as Associate Professor and Professor of Physics and, during his last year there, as Acting Chairman of the Department of Physics. He came to NRL with the appointment of Associate Director of Research in September 1968.

Dr. Goodman's research interests are centered on acoustic propagation, scattering, and physical acoustics. During the summer of 1974 he was a Lecturer in physical acoustics at the Enrico Fermi School of Physics in Italy. He also maintains an active interest in solid state physics.

Dr. Goodman is a member of the American Physical Society, the American Geophysical Union, the American Institute of Physics, Sigma Xi, Phi Kappa Phi, and Tau Beta Pi; and he is a Fellow of the Acoustical Society of America. He was also a member of the Board of Trustees of the Colorado State University Research Foundation and the NAS/NRC Committee on Undersea Warfare.



#### Key Personnel

<u>Name</u>	<u>Title</u>
Dr. R.R. Goodman	Associate Director of Research for Oceanology
Mr. W.L. Brundage	Special Assistant
Mr. D. Steiger	Head, Shipboard Computing Group
Mr. A.L. Gotthardt	Head, Ship Facility Group
Dr. J.C. Munson	Superintendent, Acoustics Division
Mr. R.J. Bobber	Superintendent, Underwater Sound Reference Division
Dr. V.J. Linnenbom	Superintendent, Ocean Sciences Division
Dr. J.P. Walsh	Superintendent, Ocean Technology Division

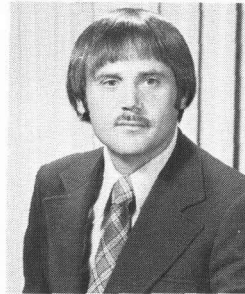
## SHIPBOARD COMPUTING GROUP

### Basic Responsibilities

The Shipboard Computing Group develops, operates, and maintains computer facilities on NRL research ships. The Group assists experimenters in the use of their measuring equipment and the utilization of the shipboard computer system in the automatic acquisition, reduction, and processing of their data. The Group performs this work under the Associate Director of Research for Oceanology.

### Key Personnel

<u>Name</u>	<u>Title</u>
Mr. D. Steiger	Head, Shipboard Computing Group



Mr. D. Steiger

### Personnel Complement

On Board: 7

### Total Estimated R&D Funding

Fiscal Year 1975: \$170,000

## SHIP FACILITY GROUP

### Basic Responsibilities

The Ship Facility Group is responsible for coordinating, maintaining, and providing ship services, sea-going facilities, and specialized expertise in the area of navigation, communication, explosives, and deck handling common to and required by the at-sea experiments of Research Divisions under the Associate Director of Research for Oceanology.

### Key Personnel

<u>Name</u>	<u>Title</u>
Mr. A.L. Gotthardt	Head, Ship Facility Group



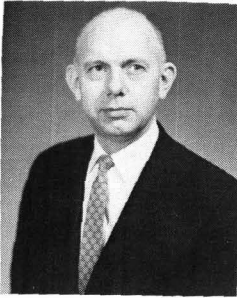
Mr. A. L. Gotthardt

### Personnel Complement

On Board: 18

### Total Estimated R&D Funding

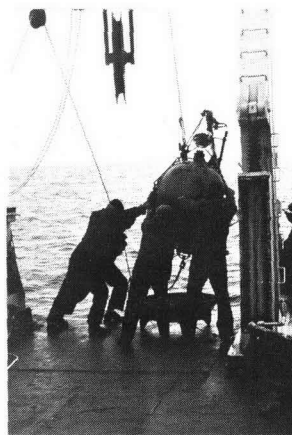
Fiscal Year 1975: \$3,000,000



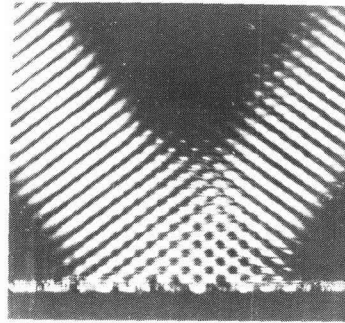
Dr. J. C. Munson

# Acoustics Division

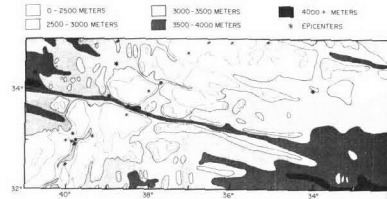
- LARGE APERTURE SYSTEMS
- PHYSICAL ACOUSTICS
- TRANSDUCER
- PROPAGATION
- SHALLOW WATER SURVEILLANCE



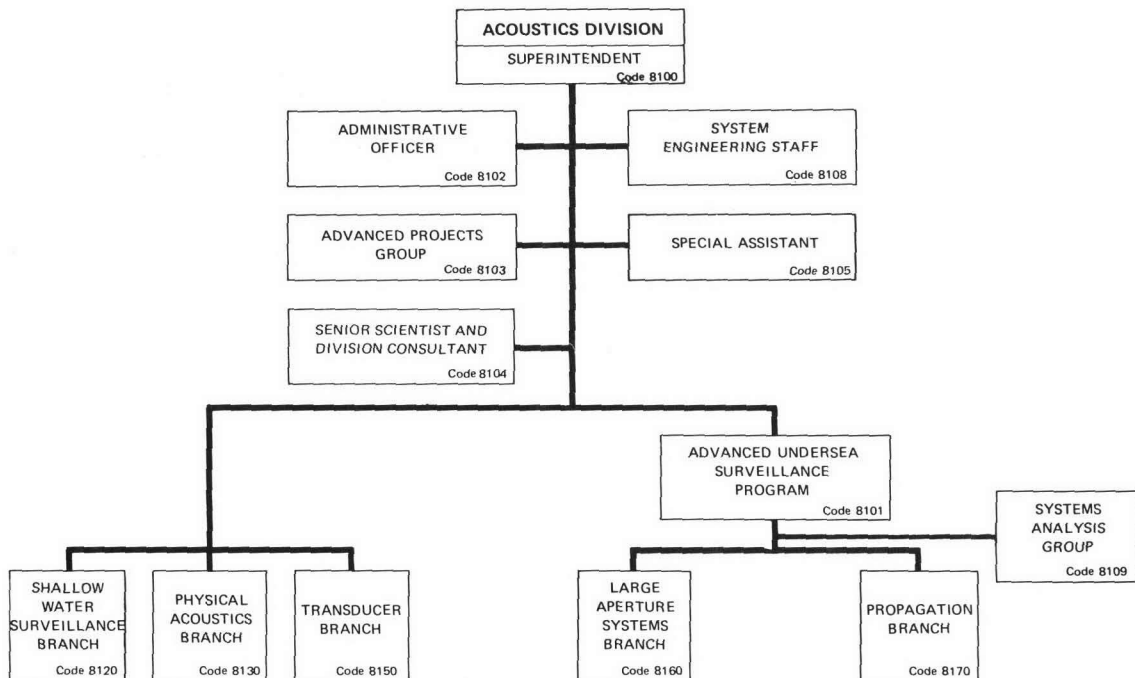
LAUNCHING  
EXPERIMENTAL BUOYS



ACOUSTIC FIELD VISUALIZATION  
WITH SCHLIEREN TECHNIQUES



MAP OF HAYES FRACTURE ZONE



## Basic Responsibilities

The Acoustics Division has major responsibilities for basic and applied research and development in the Navy's undersea warfare programs. The spectrum of work covered in the program includes acoustic radiation and transduction, propagation and scattering, environmental prediction, surveillance system concepts, and system analysis. The Division conducts theoretical and experimental research programs in physical acoustics and ocean acoustics; it develops models of the interaction of acoustic energy with the ocean environment and with structures; it conducts experiments in the deep ocean, in acoustically shallow water and in the Arctic. The Division program is heavily oriented toward research and development in support of the undersea surveillance mission, but also includes other missions. The Division is supported by an Engineering Staff in the conduct of at sea experiments aboard the USNS HAYES and often uses other ships and aircraft in multiplatform experiments. The Division interacts with research programs outside the Division in areas such as oceanography, deep ocean technology, systems analysis, and Fleet operations.

## Staff Activities

<u>System Engineering</u>	<u>Systems Analysis</u>	<u>Advanced Projects</u>
Support and ship facility	Systems studies	Advanced surveillance systems
Acoustic sources	Surveillance systems	Information processes for
Engineering research	planning and evaluation	underwater acoustics

## Branches

<u>Shallow Water Surveillance</u>	<u>Large Aperture Systems</u>
Mode analysis	Active target detection and classification
Model the signal, noise and reverberation fields	Propagation, coherency, and wave front behavior
Source and receiving array configurations	Low frequency monostatic and bistatic reverberation studies
Signal design and processing requirements	Propagation models
<u>Physical Acoustics</u>	Natural and man-made noise
Ultrasonic investigation of liquids and amorphous solids	Microstructure
Reflection, diffraction, scattering by bodies	<u>Propagation</u>
Target strength modeling	Long-range propagation models
Light-sound interaction	Application of long-range low-frequency propagation
Bulk and interface wave properties	Scattering from ocean bottom, surface, and volume
<u>Transducer</u>	Arctic underwater acoustics
Basic radiation theory	Very low frequency propagation
Electroacoustic modeling	Acoustic fluctuations
Transducer physical models	
Calibration of large transducer arrays	
Acoustic array calculations	

## Key Personnel

<u>Name</u>	<u>Title</u>
Dr. J.C. Munson	Superintendent
Mrs. Joretta L. Williams	Administrative Officer
Dr. S. Hanish	Senior Scientist and Division Consultant
Mr. R.R. Rojas	Head, Advanced Undersea Surveillance Program
Mr. F.C. Titcomb	Special Assistant to Superintendent
Mr. W.J. Finney	Head, Advanced Projects Group
Mr. R.R. Rojas*	Head, System Engineering Staff
Dr. J.C. Knight	Head, Systems Analysis Group
Mr. R.H. Ferris	Head, Shallow Water Surveillance Branch
Dr. C.M. Davis, Jr.	Head, Physical Acoustics Branch
Mr. W.J. Trott	Head, Transducer Branch
Dr. B.B. Adams	Head, Large Aperture Systems Branch
Mr. B.G. Hurdle	Head, Propagation Branch

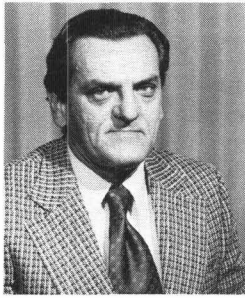
## Personnel Complement

On Board: 138

Total Estimated R&D Funding

Fiscal Year 1975: \$7,779,800

\*Acting

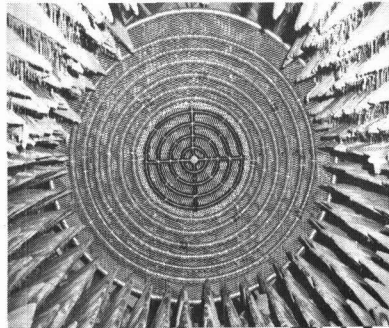
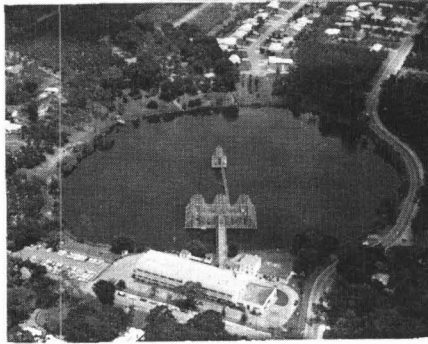


Mr. R. J. Bobber

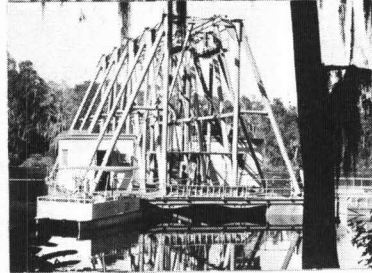
## Underwater Sound Reference Division

- UNDERWATER ELECTROACOUSTIC MEASUREMENT METHODS
- UNDERWATER ELECTROACOUSTIC STANDARDS
- UNDERWATER ELECTROACOUSTIC MEASUREMENT SERVICES

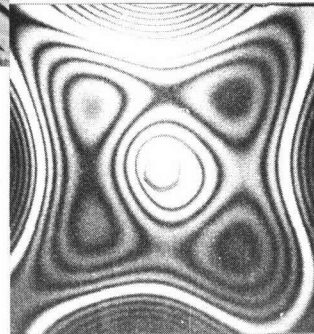
UNDERWATER SOUND REFERENCE DIVISION,  
ORLANDO, FLORIDA



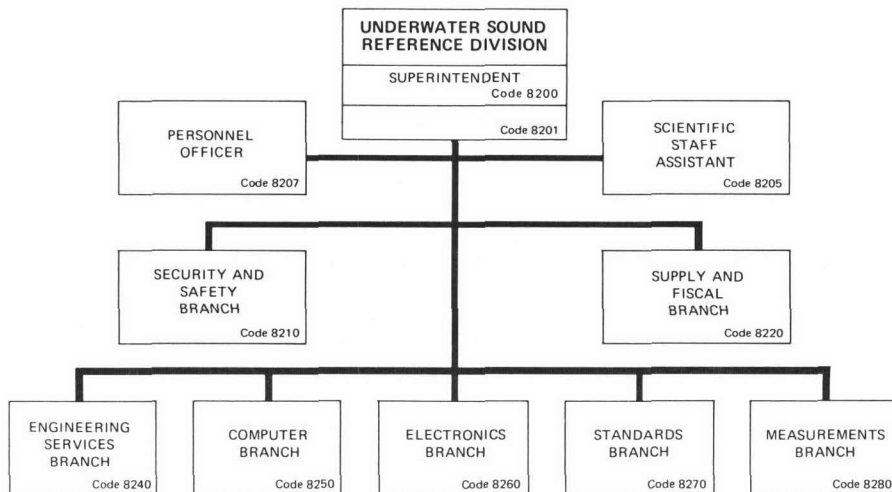
NEAR-FIELD TRANSDUCER  
ARRAY IN ANECHOIC  
TANK FACILITY



LEESBURG FACILITY -  
CALIBRATION BARGE



HOLOGRAM OF VIBRATING  
TRANSDUCER DIAPHRAGM



### Basic Responsibilities

The Underwater Sound Reference Division is a focal point in the Navy for standardization in the science and technology of underwater sound measurements. Its research and development program is aimed at expanding the state of the art and providing Navy in-house expertise. Reference calibration measurements in a large complex of specialized facilities and calibrated standard transducers are available to all naval activities and contractors in support of undersea warfare programs.

### Research and Development Branches

#### Measurements

Calibration theory and accuracy  
Measurement methods  
Standard calibration services  
Sonar transducer test and evaluation  
Measurements on acoustic materials  
Measurement facility development

#### Standards

Acoustic materials  
Electroacoustic standards  
Acoustic sources  
Specialized electroacoustic transducers  
Vibration analysis techniques  
Standard loan services

#### Computer

Computerized data reduction  
Computation services

#### Electronics

Digital systems  
Analog systems  
Signal analysis

### Key Personnel

<u>Name</u>	<u>Title</u>
Mr. R.J. Bobber	Superintendent
Mr. I.D. Groves	Associate Superintendent
Mr. J.M. Taylor	Scientific Staff Assistant
Mr. V.A. Lombardo	Personnel Officer
Mr. J.C. Michael	Head, Supply and Fiscal Branch
Mr. R.G. Johnson	Head, Security and Safety Branch
Mr. W.W. Carlson	Head, Engineering Services Branch
Mr. J.D. George	Head, Computer Branch
Mr. M.O. Rhue	Head, Electronics Branch
Mr. I.D. Groves	Head, Standards Branch
Dr. J.E. Blue	Head, Measurements Branch

### Personnel Complement

On Board: 95  
(Graded 76, Ungraded 19)

### Total Estimated R&D Funding

Fiscal Year 1975: \$2,000,000

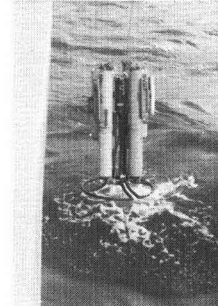


Dr. V. J. Linnenbom

# Ocean Sciences Division

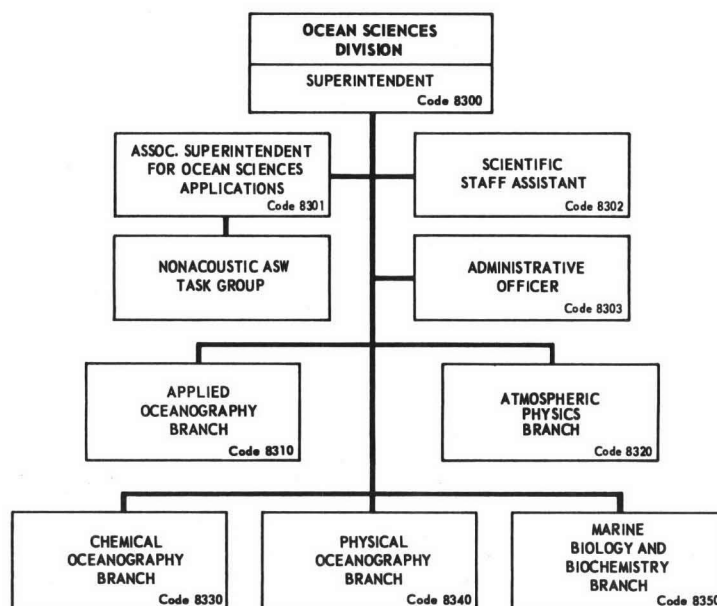
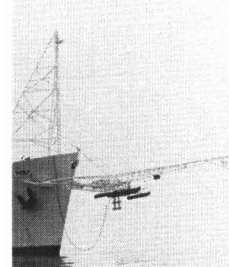
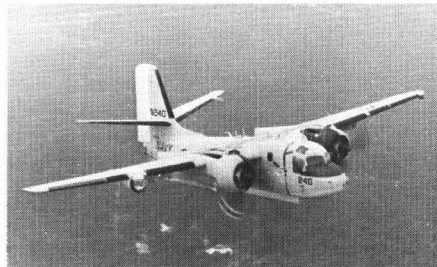
- APPLIED OCEANOGRAPHY
- ATMOSPHERIC PHYSICS
- CHEMICAL OCEANOGRAPHY
- PHYSICAL OCEANOGRAPHY
- MARINE BIOLOGY & BIOCHEMISTRY
- NONACOUSTIC ASW

## OCEANOGRAPHY



## AIR-SEA INTERACTIONS

## ATMOSPHERIC PHYSICS AND CHEMISTRY



## Basic Responsibilities

The primary responsibility of the Ocean Sciences Division is research on fundamental problems in oceanography and the atmospheric sciences. The Division also engages in development work to transfer research results into applications. At present, the Division studies problems in physical, chemical, and biological oceanography and in atmospheric physics to gain a better understanding of the Navy's operational environment. This knowledge is applied to the solution of various Navy problems such as anti-submarine warfare, protection of the marine environment, biodegradation of materials, and oceanic and atmospheric prediction.

## Staff Activity

### Nonacoustic ASW (R&D) Task Group

## Branches

### Applied Oceanography

Antisubmarine warfare  
Hydrodynamics of submerged bodies  
Radiometric characteristics of the ocean

### Atmospheric Physics

Atmospheric dynamics  
Cloud physics  
Weather instrumentation  
Fog studies

### Chemical Oceanography

Physical and analytical chemistry of  
seawater, dissolved gases, and marine  
sediments

### Physical Oceanography

Hydrodynamics and turbulence of the  
oceans  
Marine geophysics  
Air-sea interactions

### Marine Biology & Biochemistry

Biodegradation in the marine environment  
Marine biochemistry  
Biological oceanography  
Bioluminescence

## Key Personnel

### Name

### Title

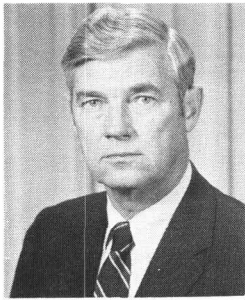
Dr. V.J. Linnenbom	Superintendent
Dr. J.O. Elliot	Associate Superintendent for Ocean Science Applications
Mrs. Ruth M. Baltzell	Administrative Officer
Dr. A.H. Schooley	Senior Research Scientist
Mr. H.L. Clark	Head, Applied Oceanography Branch
Dr. L.H. Ruhnke	Head, Atmospheric Physics Branch
Dr. C.H. Cheek	Head, Chemical Oceanography Branch
Dr. J.M. Witting	Head, Physical Oceanography Branch
Dr. D.W. Strasburg	Head, Marine Biology and Biochemistry Branch

## Personnel Complement

On Board: 91

## Total Estimated R&D Funding

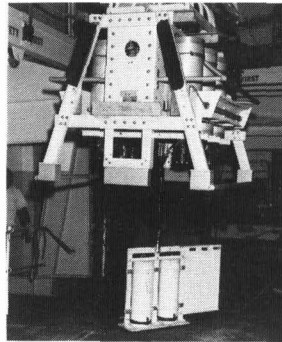
Fiscal Year 1975: \$5,653,000



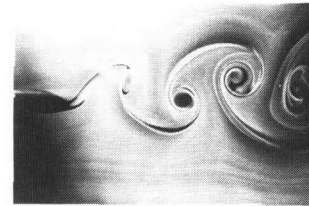
Dr. J. P. Walsh

## Ocean Technology Division

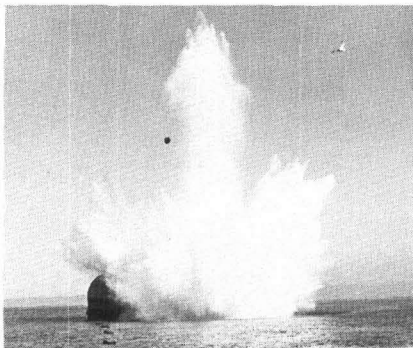
- OCEAN ENGINEERING
- MECHANICS OF MATERIALS
- OCEAN INSTRUMENTATION
- APPLIED MECHANICS
- SHOCK AND VIBRATION INFORMATION CENTER



*LIBEC*



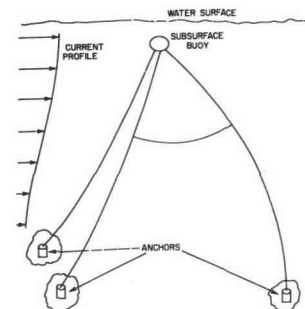
*VORTEX SHEDDING FROM A VIBRATING CYLINDER*



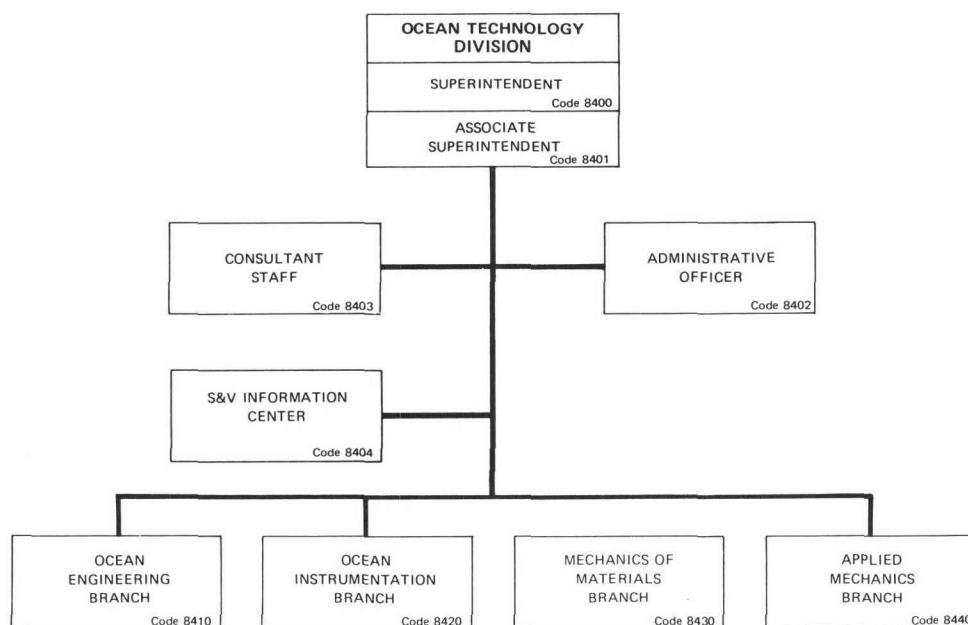
*UNDERWATER SHOCK TESTS*



*MIZAR*



*CABLE ARRAYS*



### Basic Responsibilities

The Ocean Technology Division researches, develops, and applied specialized equipment, instrumentation, and techniques for conducting ocean and ocean-floor operations, and it evolves operational technology for advanced systems. The division utilizes advanced materials and design technology for engineering optimization of required equipment. It also conducts research activities in select areas of ocean technology with coupling and support activities related to other ongoing research and development in these and other fields of interest. The DoD Shock and Vibration Information Center is included in the Division; this Center provides a single source for up-to-date information on shock and vibration for scientists and engineers. This Division, in conjunction with other Divisions of NRL and out-of-house agencies, brings the collective expertise to bear on crucial problems.

### Staff Activity

#### S&V Information Center

#### Branches

##### Ocean Engineering

- Research and development on ocean systems, subsystems, and components
- Systems engineering
- Design
- Conduct at-sea operations

##### Mechanics of Materials

- Fracture mechanics and fracture strength
- Plastic flowing
- Compression failure mechanisms
- Armor research and development
- Deep submergence materials-structures
- Missile component failure
- Nondestructive testing

##### Applied Mechanics

- Shipboard shock fundamentals
- Shock protection for weapons systems
- Methods for design against shock
- Fracture mechanics design studies
- Developmental studies of prototypes
- Shock strength of materials
- Hydromechanic studies

##### Ocean Instrumentation

- Instrumentation analysis, research and development
- Sensors, detectors
- Data and signal processing
- Stress and kinematic quantities measurements

### Key Personnel

<u>Name</u>	<u>Title</u>
Dr. J.P. Walsh	Superintendent
Mr. C.L. Buchanan	Associate Superintendent
Mrs. Anna G. Branham	Administrative Officer
Dr. R.O. Belsheim	Consultant
Mr. H.C. Pusey	Head, S&V Information Center
Mr. G.O. Thomas	Head, Ocean Engineering Branch
Mr. H.A. Johnson	Head, Ocean Instrumentation Branch
Dr. J.M. Krafft	Head, Mechanics of Materials Branch
Dr. F. Rosenthal	Head, Applied Mechanics Branch

### Personnel Complement

On Board: 81

### Total Estimated R&D Funding

Fiscal Year 1975: \$4,700,000

# The Support Services Department

The Director of Support Services is a Navy Captain with appropriate training and experience; he reports to the Director of NRL. His primary responsibility is the supervision, coordination, and control of the administrative and service operations required in support of the work of the Research Department. Usually, he is the next senior officer to the Director and assumes the responsibilities of and acts for the Director in his absence.

The Director of Support Services is responsible for:

- guiding and coordinating the service divisions of the Laboratory (Engineering Services, Supply, Public Works, Technical Information, and Chesapeake Bay) and also his staff functions (Management Engineer and Patent Counsel) so that services rendered are adequate, prompt, accurate, and economical in the use of men and money.
- implementing, for the Director of NRL, the orders and instructions of higher authority in a manner appropriate to the research environment as manifested in the policies and the organization of the Laboratory.
- being familiar with the scientific program and for following the progress of the scientific efforts of the Laboratory in sufficient detail to ensure that administrative decisions are made which support the scientific program.
- assisting the Director of NRL in maintaining an overall plan of organization for the best direction and control of the Laboratory.
- keeping the Director of NRL advised of matters requiring his attention, decision, or other action; acting for the Director of NRL in the approval of usual or routine matters; for assisting the Director of NRL generally with administrative detail, correspondence, reports, and similar matters.
- formulating, amending, and issuing instructions, policy statements, and procedures approved by the Director of NRL.

The Director of Support Services keeps in constant touch with the Director of Research to ensure that the service units of the Laboratory are providing complete support to the scientific divisions. He coordinates with the Director of Research in the planning and carrying out of administrative actions affecting Research Department organization and personnel; and he maintains a close working relationship with the Chief Staff Officer and officers assigned to him to assure provision of support services in operations conducted by the Chief Staff Officer. He also has direct "line" authority over the heads of special staff and service divisions.

## Director, Support Services

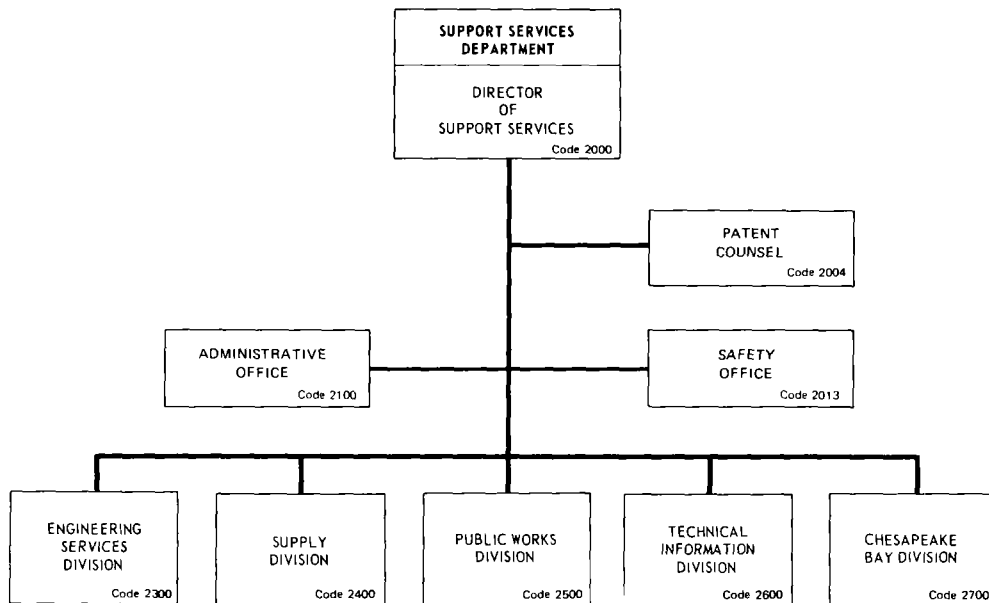


Captain Myron V. Ricketts, USN

Captain Myron V. Ricketts, [REDACTED] is a second generation naval officer and a 1955 graduate of the U.S. Naval Academy. After receiving his commission he spent 3 years at the Massachusetts Institute of Technology where in 1960 he received an M.S. degree in naval architecture and marine engineering and an engineer's degree as a Naval Engineer. In 1968 he received an M.S. degree in Management from the Naval Post Graduate School in Monterey, California.

Designated for Engineering Duty upon graduation from the Academy, Capt. Ricketts has spent 6 years on sea duty, which included 2 years as Engineer Officer aboard the USS INDEPENDENCE. His other assignments included a tour in the Norfolk Naval Shipyard Production Department; a 2-year tour with the Special Projects Office (navigation); a 1-year tour as an advisor in the Saigon Naval Shipyard; a tour in the Officer Assignment Placement Branch of the Bureau of Personnel; and a tour in the Office of Naval Operations as Special Assistant to the Director of Planning, Programming, and Budgeting (OP-090). His most recent assignment before reporting to NRL was a 7-month special assignment to CINCUSNAVEUR, London, where he was involved in Mediterranean ship maintenance matters.

Captain Ricketts, who is married and has two sons, currently resides in West Springfield, Virginia.



### Key Personnel

<u>Name</u>	<u>Title</u>	<u>Code</u>
CAPT M.V. Ricketts, USN	Director of Support Services	2000
Dr. A.L. Branning	Patent Counsel	2004
Mr. H. Kennedy	Safety Officer	2013
Mr. J. Cooper	Head Administrative Office	2100
CDR H.D. Swanson, Jr., USN	Engineering Services Officer	2300
CDR R.W. Gunther, SC, USN	Supply Officer	2400
CDR A.E. Church, Jr., CEC, USN	Public Works Officer	2500
Mr. E.E. Kirkbride	Head, Technical Information Division	2600
CDR J.M. Fitts, USN	Chesapeake Bay Division Officer	2700

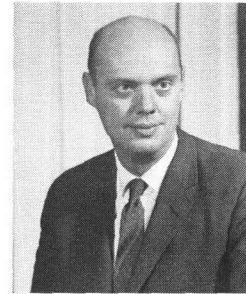
# OFFICE OF PATENT COUNSEL

## Basic Responsibilities

The Office of Patent Counsel provides services concerning inventions, patents, trademarks, copyrights, and other related matters. Patent applications are prepared, filed, and prosecuted on NRL inventions of significance to the Government. The Patent Counsel serves as consultant and adviser on patent and data clauses in R&D and procurement contracts, claims of patent or copyright infringement involving NRL, and the provisions in interagency agreements relating to inventions, patents, trademarks, copyrights, and related matters. Assistance is provided the Research Department through state-of-the-art searches in the patent literature pertinent to particular research problems.

## Key Personnel

<i>Name</i>	<i>Title</i>
Dr. A.L. Branning	Patent Counsel
Dr. P. Schneider	Deputy Patent Counsel



Dr. A. L. Branning

## Personnel Complement

On Board: 22  
(Includes NRL and ONR)

# ADMINISTRATIVE OFFICE

## Basic Responsibilities

The Administrative Office provides staff support to administrative officials of the Laboratory in the areas of Travel, Records and Correspondence Management Control, Mail and Messenger service, Forms Design and Analysis, Report Analysis and Control, Directives Control for all components of the Laboratory, updating the NRL Code Directory, and the administration of the Laboratory Parking Facilities. In addition, the office conducts routine administrative correspondence with other units of the Navy, DOD, and other governmental agencies.

## Key Personnel

<i>Name</i>	<i>Title</i>
Mr. J. Cooper	Head, Administrative Office
Mrs. Theodosia Wilder	Head, Travel Branch
Mrs. Lenora V. Dabney	Head, Records and Correspondence Management Branch
Mr. O.L. Scott	Head, Mail and Messenger Branch



Mr. J. Cooper

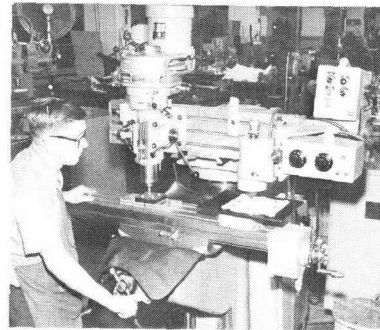
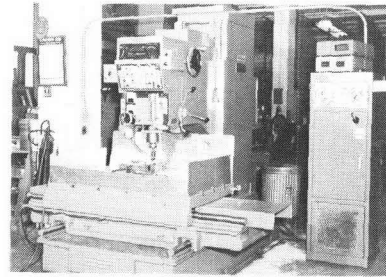
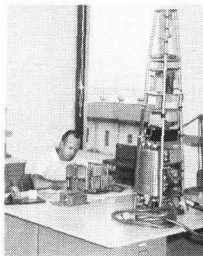
## Personnel Complement

On Board: 36

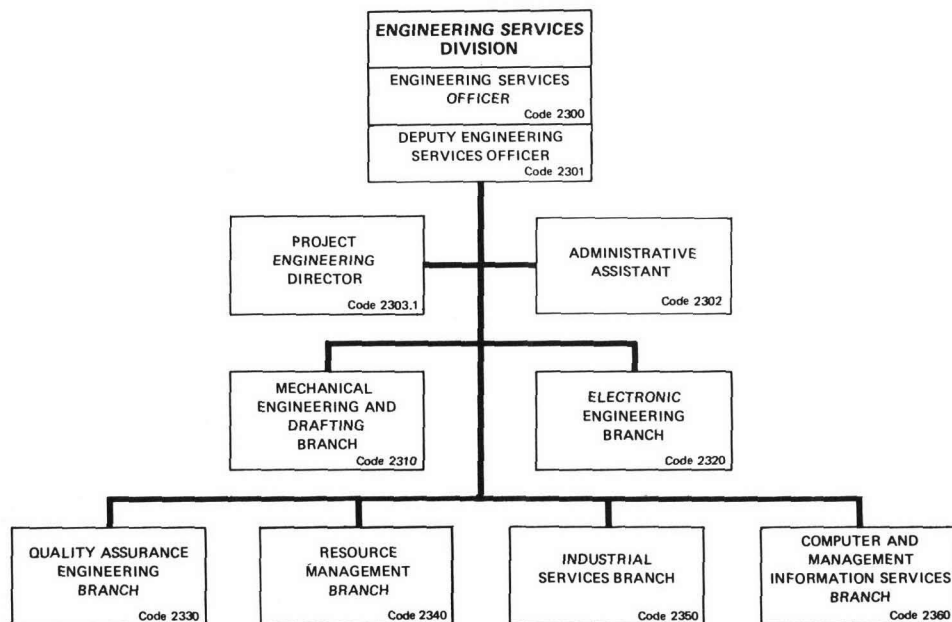


CDR H. D. Swanson, Jr. USN

# Engineering Services Division



- MECHANICAL ENGINEERING AND DRAFTING
- ELECTRONIC ENGINEERING
- QUALITY ASSURANCE ENGINEERING
- RESOURCE MANAGEMENT
- INDUSTRIAL SERVICES
- COMPUTER AND MANAGEMENT INFORMATION SERVICES



### Basic Responsibilities

The Engineering Services Division provides the engineering, design, fabrication, assembly, and test of experimental research equipment in support of the Laboratory's research efforts.

### Key Personnel

<u>Name</u>	<u>Title</u>
CDR H.D. Swanson, Jr., USN	Engineering Services Officer
Mr. P.R. Shifflett*	Deputy Engineering Services Officer
Mrs. Doris A. Chiplock	Administrative Officer
Mr. J.P. Manning	Assistant for Operations
Mr. M. Shimkus*	Head, Mechanical Engineering and Drafting Branch
Mr. J. Brotzman	Head, Electronic Engineering Branch
Mr. P.C. Buck	Head, Quality Assurance Engineering Branch
Mr. E.C. Trexler*	Head, Resource Management
Mr. J.L. Leizear	Head, Industrial Services Branch
Mr. L.G. Murphy	Head, Computer and Management Information Services Branch

### Personnel Complement

On Board: 505

(Graded 185, Upgraded 319, Military 1)

Management & Staff	52
Engineers	36
Technicians	125
Journeyman	223
Machine Operators & Helpers	25
Apprentices	44

\*Acting

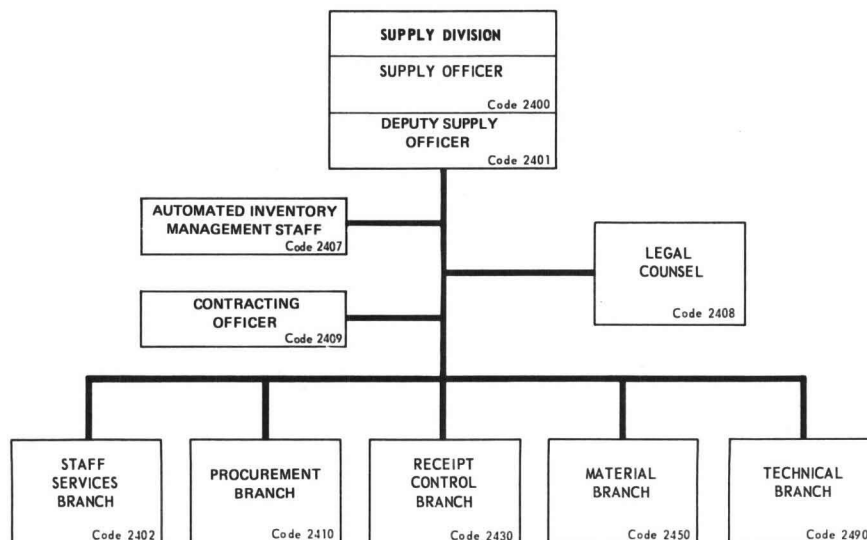


CDR R. W. Gunther

# Supply Division



- STAFF SERVICES
- PROCUREMENT
- RECEIPT CONTROL
- MATERIAL
- TECHNICAL



### Basic Responsibilities

The Supply Division provides service functions to the Laboratory and its field activities, including the operation of Supply issue stores, procurement of equipment, material, and contractual services, receipt, inspection and delivery of material and equipment; storage of inactive laboratory equipment; packing, shipping, and traffic management; and survey and disposal of excess and unusable property.

In addition, Supply offers technical and counseling services to the Research Departments, in the development of specifications for a complete procurement package; consultation as needed in the handling of claims against the Laboratory, guidance in the performance stages of contractual services, and transportation and storage problems.

During FY 1974 the Supply Division occupied 169,788 sq. ft. of building space; its stores (six retail and one bulk warehouse) inventory averaged \$798,272.00; stores issues totalled \$2,051,503.00; disposals totalled \$4,125,068.00; and the Procurement Branch processed 36,769 procurement documents totaling \$38,164,946.00 on the open-market with an additional 10,208 documents totaling \$80,332,510.00 to other Government organizations for a grand total of 46,977 documents totalling \$118,497,456.

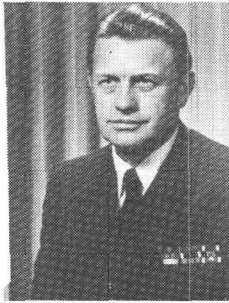
### Key Personnel

<u>Name</u>	<u>Title</u>
CDR R.W. Gunther, SC, USN	Supply Officer
Mr. R.S. Sylvest	Deputy Supply Officer
Atty. A.S. Horton	Legal Counsel
LCDR D.A. Tarantino	Contracting Officer
Mr. A.W. Medley, Sr.	Head, Staff Services Branch
Mr. J.W. Altman	Head, Automated Inventory Management Staff
Mr. J.D. Williams	Head, Procurement Branch
Mrs. Virginia S. Thomas	Head, Receipt Control Branch
Mr. H.W. Dickinson	Head, Material Branch
Mr. R.R. Black	Head, Technical Branch

### Personnel Complement

On Board: 161

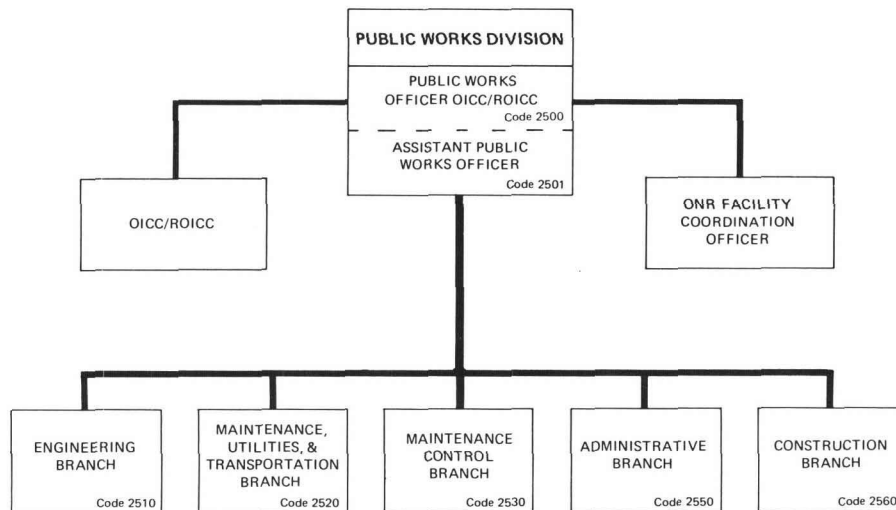
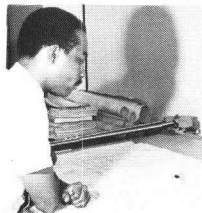
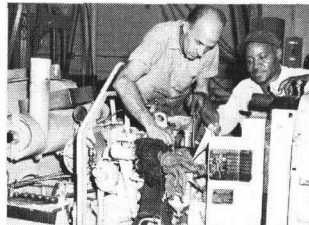
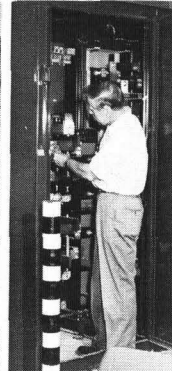
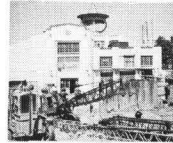
(Graded 109, Ungraded 50, Military 2)



# Public Works Division

CDR A. E. Church, Jr., CEC, USN

- ENGINEERING
- MAINTENANCE, UTILITIES, & TRANSPORTATION
- MAINTENANCE CONTROL
- ADMINISTRATION
- CONSTRUCTION



### Basic Responsibilities

The Public Works Division is responsible for the physical plant of NRL. This includes responsibility for the design, construction, operation, maintenance, and repair of all buildings, grounds, roads, utilities, and other structures and activities. Also included are transportation; weight-handling and heavy-construction equipment; heating and refrigeration plants; electric, water, steam, air, and gas supply distribution; telephone communication systems; and sewage disposal.

The Public Works Division provides professional consulting services to the scientific divisions on facilities planning and engineering.

### Key Personnel

<u>Name</u>	<u>Title</u>
CDR A.E. Church, Jr., CEC, USN	Public Works Officer/Officer in Charge of Construction/ROICC
LTJG D.J. Lee, CEC, USNR	Assistant Public Works Officer
Mr. J.R. Lescault	Head, Administrative Branch
Mr. R.A. Jacques	Head, Engineering Branch
Mr. L.P. Carpenter	Head, Maintenance, Utilities, & Transportation Branch
Mr. R.O. Weidman	Head, Maintenance Control Branch
Mr. J.B. Canha	Head, Construction Branch

### Personnel Complement

On Board: 394

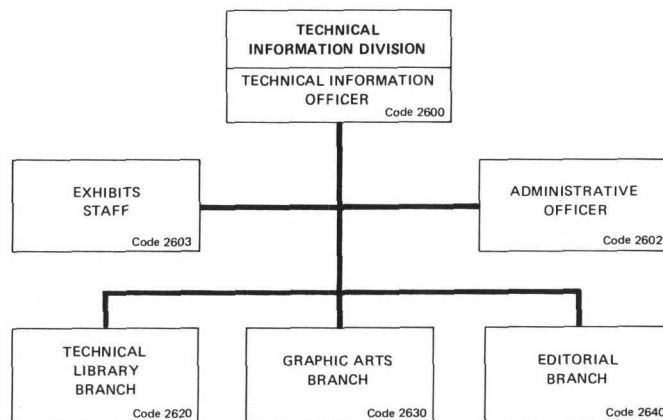
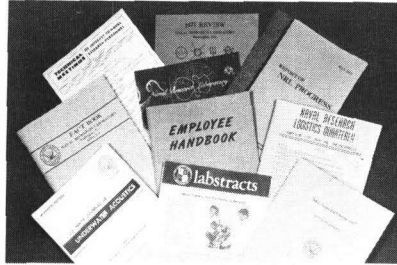
(Graded 52, Ungraded 340, Military 2)



Mr. E. E. Kirkbride

## Technical Information Division

- EDITORIAL
- LIBRARY
- GRAPHIC ARTS
- EXHIBITS



### Basic Responsibilities

The Technical Information Division plans and administers the Laboratory's program of preparing and disseminating the results of scientific research through official publications, scientific journals, presentations, films, and exhibits. It provides centralized professional services to both NRL and ONR in writing, editing, printing, exhibits, photography, graphic arts, documentation, and language-translations. It operates one of the Navy's largest integrated technical libraries with holdings of 202,000 bound volumes and 400,000 technical reports.

### Key Personnel

<u>Name</u>	<u>Title</u>
Mr. E.E. Kirkbride	Head, Technical Information Division
Mrs. Doris E. Cameron	Administrative Officer
Mr. H. Poole	Exhibits Officer
Mrs. Doris P. Baster	Librarian
Mr. D. Darr	Head, Graphic Arts Branch
Mr. W.M. Leak	Head, Editorial Branch

### Personnel Complement

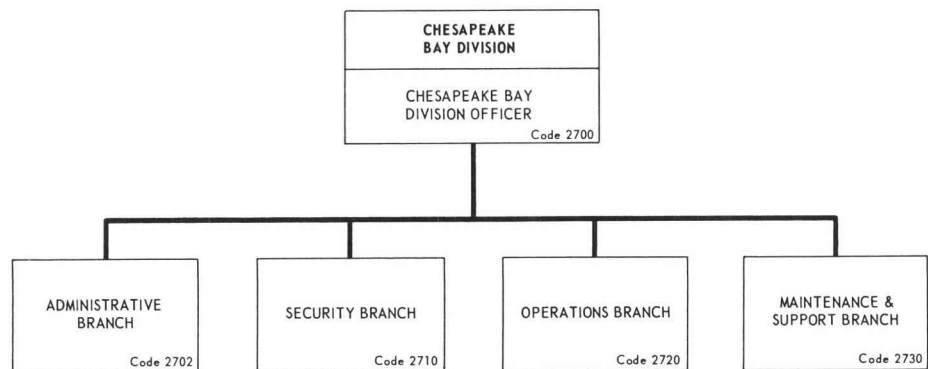
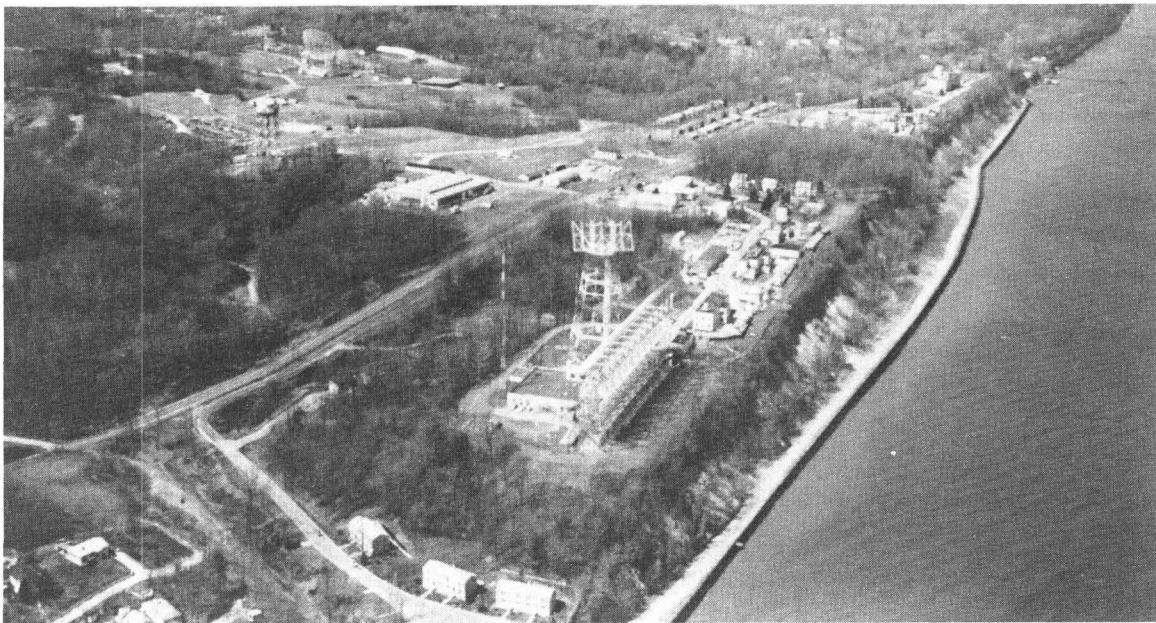
On Board: 134

(Graded 115, Ungraded 19)



CDR J. M. Fitts, USN

## Chesapeake Bay Division



### Basic Responsibilities

The Chesapeake Bay Division provides and maintains facilities and services for test development and evaluation of radar, optical radiation, and communications equipment. It also services and supports all research projects conducted at the Chesapeake Beach and Tilghman Island complexes of NRL.

### The Physical Plant

Located in a relatively clear area away from any congestion or industrial interference, the main site, at Chesapeake Beach, covers 174.9 acres containing 200 structures of various size and construction, 6 of which are major laboratory buildings. There is over 200 ft of usable dock space with a water depth of 4 to 7 ft, located 2 miles north of the main site. Off-site facilities include the Tilghman Island Facility, located directly across the Bay from CBD at a distance of about 10 miles; the Theodolite House, at North Beach; and the Off-Shore Platform, approximately 2 miles southeast of CBD in the Bay.

Research watercraft available at CBD include one 60-ft catamaran, a self propelled Jack-up Barge, and two 36-ft motor boats. These are used in support of research projects and for transportation between off-site facilities. Housing includes 24 public quarters.

### Key Personnel

<u>Name</u>	<u>Title</u>
CDR J.M. Fitts, USN	Division Officer
Mrs. M. Joyce Hamor	Administrative Officer
Mr. A. McKamey	Security Officer
BMCM George Dewey, USN	Operations Officer
Mr. R.M. Conlyn	Station Engineer

### Research Division Representatives

#### Optical Sciences Division

Mr. A.C. Grosvenor, Optical Science Division Representative  
Mr. T.H. Cosden, Field Experiments Representative

#### Radar Division

Mr. D.C. Rohlfs, Radar Division Representative and Radar  
Techniques Branch  
Mr. P.W. Ward, Target Characteristics Branch  
Mr. M.C. Licitra, Search Radar Branch  
Mr. M.W. Lehman, Operations System Section

#### Plasma Physics Division

Mr. L.T. Humphreys, Plasma Physics Division Representative

#### Tactical Electronics Warfare Division

Mr. L.D. Jones

### Personnel Complement

On Board: 92

(Graded 35, Ungraded 55, Military 2)

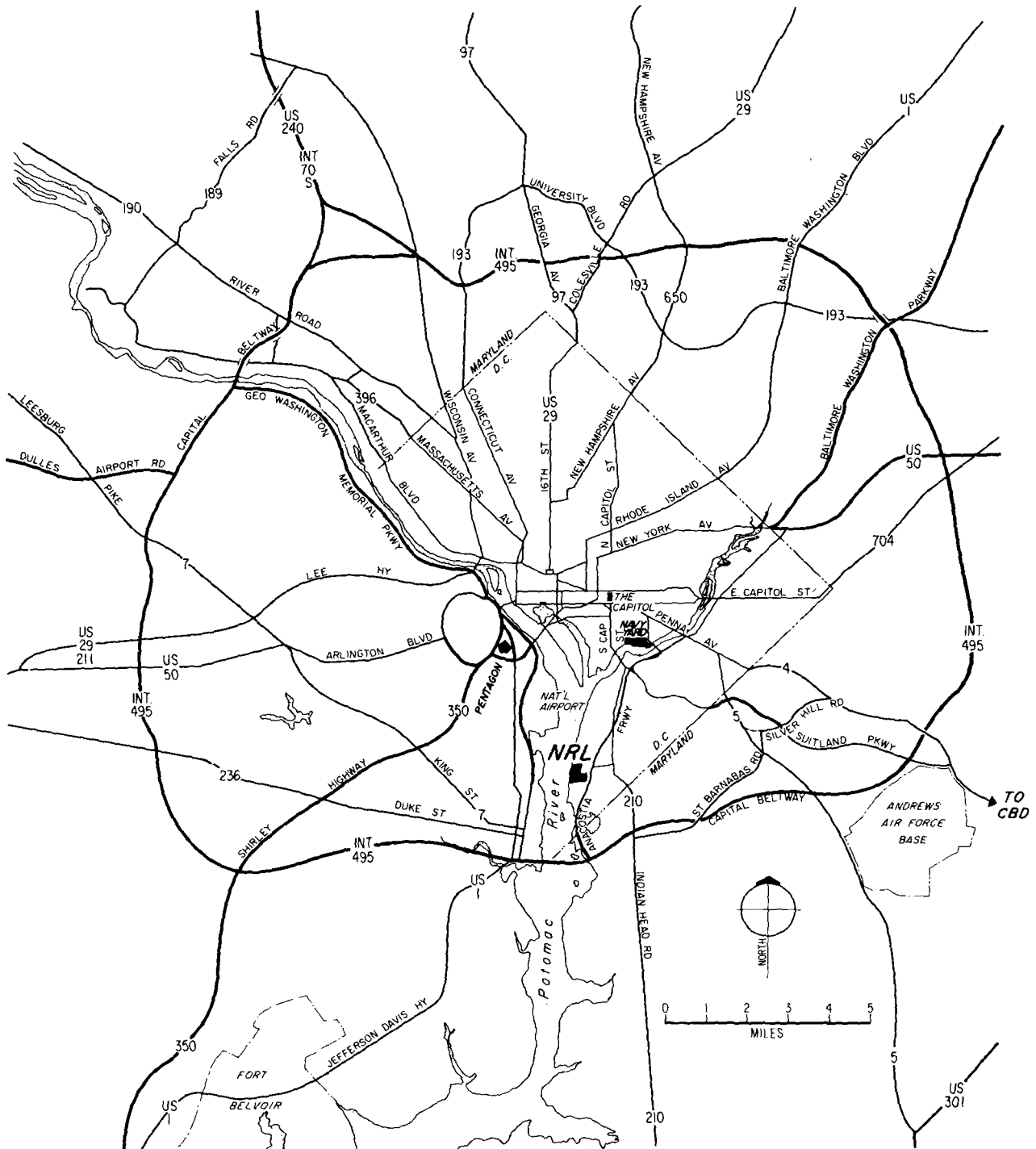
# Awards Received by Civilian Employees

As of November 1, 1974

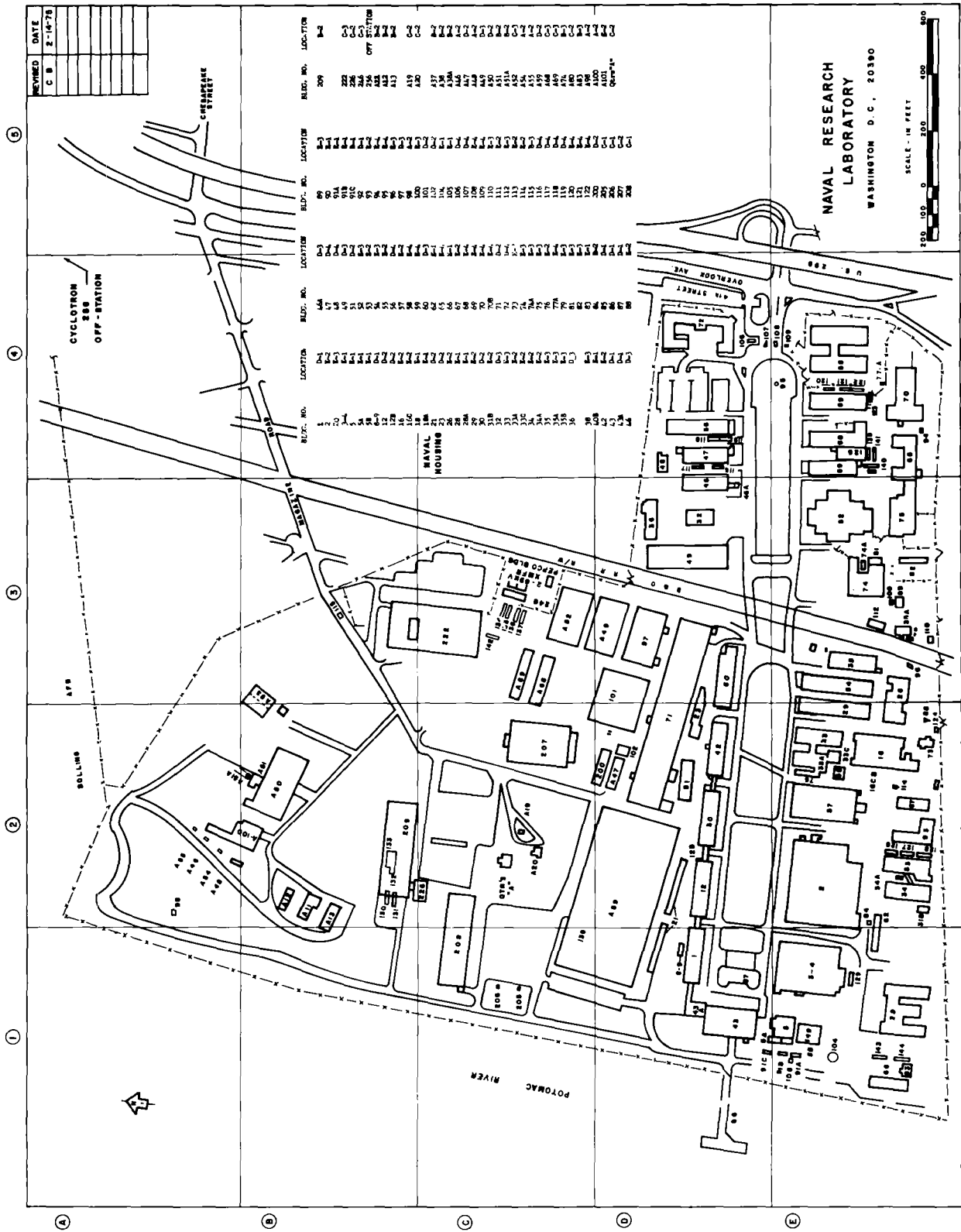
<u>Government Awards</u>	<u>Number</u>
Chair of Science Award (local NRL Award)	4
Department of Defense Certificate of Merit	1
Department of Defense Distinguished Civilian Service Award	6
E.O. Hulburt Annual Science Award (local NRL Award)	19
Federal Woman's Award	1
NASA Scientific Achievement Medal	1
National Medal of Science from the President of the United States	1
Navy Award for Distinguished Achievement in Science	4
Navy Captain Robert Dexter Conrad Award	6
Navy Distinguished Civilian Service Award	61
Navy Meritorious Civilian Service Award	202
Navy Superior Civilian Service Award	40
The Certificate of Merit from the President of the United States	11
The Medal of Merit from the President of the United States	1
The President's Award for Distinguished Federal Civilian Service	2
 <u>Non-Government Awards</u>	
A.G. Bissell Memorial Award	1
A.K. Doolittle Award	1
Albert A. Michelson Award of the Franklin Institute	1
Albert Sauveur Achievement Award	1
American Nuclear Society Special Award	1
Ancel Prize of the French Photographic Society	1
Annual Award of the Society for Applied Spectroscopy	2
Applied Science Award of the Scientific Research Society of America	22
Arthur S. Fleming Award of the Washington Chamber of Commerce	3
Award in the Mathematical Sciences of the Washington Academy of Sciences	1
Award for Technical Achievement of the American Society of Mechanical Engineers	1
Award in the Physical Sciences of the Washington Academy of Sciences	4
Award of Merit of the American Society for Testing and Materials	1
Brazilian Legion of Naval Merit	1
Burgess Memorial Award of the American Society for Metals	2
Burgess Memorial Lecture of the American Society for Metals (Washington Section)	1
Burgess Prize Award of the American Society for Metals	2
Charles B. Dudley Medal of the American Society for Testing Materials	4
District Meritorious Certificate Award of the American Welding Society	1
Dryden Research Award of the American Institute of Aeronautics and Astronautics	1
E. Edward Pendray Award of the American Rocket Society	1
Eddington Medal of the Royal Astronomical Society (Great Britain)	2
Engineers and Architects Day Award	4
Engineering Science Award of the Washington Academy of Sciences	2
Frank Booth Award — International Power Sources Symposium	1
Frederic Ives Award of the Optical Society of America	2
George Kimball Burgess Memorial Award	1
Gold Medal Award of the American Society of Naval Engineers	2
Harry Diamond Award of the Institute of Radio Engineers	4
Henry Draper Medal of the National Academy of Sciences	1
Hillebrand Prize of the American Chemical Society	3
Irwin Vigness Award by the Institute of Environmental Sciences	1
James H. Wyld Memorial Award of the American Rocket Society	1
John Adam Fleming Award by the American Geophysical Union of the National Academy of Sciences — National Research Council	1
John A. Penton Gold Medal of the American Foundrymen's Society	1

<u>Non-Government Awards (Continued)</u>	<u>Number</u>
Joseph S. Seaman Gold Medal Award of the American Foundrymen's Society	1
Kendall Company Award of the American Chemical Society	1
Kratel Award of the Eurocontamination Foundation	1
Janssen Medal of the French Photographic Society	1
John Scott Medal of the City of Philadelphia	1
M. Barry Carlton Award Institute of Electrical & Electronics Engineers	1
Marcus A. Grossman Award — American Society of Metals	2
Mayo D. Hersey Award of the American Society of Mechanical Engineers	1
Medal of Honor Award of the Institute of Radio Engineers	2
Morris Liebman Memorial Prize of the Institute of Radio Engineers	1
National Capital Award of the D.C. Council of Engineering and Architectural Societies	3
National Civil Service League Career Service Award	1
National Award of the American Society of Lubrication Engineers	1
Notre Dame Centennial Award	2
Outstanding Americans Foundation Award	1
Patrons Award of the Institute of Radio Engineers	2
Pittsburgh Spectroscopy Award of the Spectroscopy Society of Pittsburgh	1
Professional Achievement Award of the D.C. Council of Engineering and Architectural Societies	1
Progress Award of the Photographic Society of America	1
Pure Science Award of the Scientific Research Society of America	22
Reliability and Quality Control Award of the Radio Engineers Professional Group	2
Rockefeller Public Service Award	1
Sam Tour Award	2
Service Award of the Chemical Society of Washington	1
Service to Mankind Award of the Washington Sertoma Award	1
Society of Technical Writers & Publishers — Washington, D.C. Chapter	1
Society of Women Engineers Achievement Award	1
Space Science Award of the American Institute of Aeronautics & Astronautics	1
Stuart Ballantine Medal of the Franklin Institute of Pennsylvania	2
Trent — Credo Award — Acoustical Society of America	1
United Negro College Fund Distinguished Service Citation	1
Victor K. LaMer Award for Outstanding Graduate Research in Colloid & Surface Chemistry	1
William Blum Award of the Washington-Baltimore Electrochemical Society	3
William Hunt Eisenman Medal	1

# Location of NRL



## Location of Buildings at Main Site



**POTOMAC RIVER**

**DISTRICT OF COLUMBIA**  
(BLUE PLAINS)  
SEWAGE TREATMENT PLANT

**LEGEND**

- EXISTING BUILDINGS & STRUCTURES
- NEW BUILDINGS & STRUCTURES
- EXISTING PROPERTY BOUNDARY
- NEW PROPERTY BOUNDARY
- EXISTING FENCE
- NEW FENCE
- EXISTING DRIVEWAYS & PAVED AREAS
- NEW DRIVEWAYS & PAVED AREAS
- EXISTING FENCE
- NEW FENCE
- EXISTING STATION ENTRANCE
- NEW STATION ENTRANCE
- EXISTING SITE
- NEW SITE
- EXISTING DIRECTION OF FLOW
- NEW DIRECTION OF FLOW
- EXISTING UNDERGROUND STRUCTURES
- NEW UNDERGROUND STRUCTURES

**NOTES**

1. BELIEVED HOUSING AREA IS NOT PART OF THE U. S. NAVAL RESEARCH LABORATORY, BUT BECAUSE OF ITS CONTIGUOUS LOCATION IT IS SHOWN ON THIS MAP.

2. LAT. 38° 49' 59"N. LONG. 77° 01' 34"W. AT FLAG POLE STRUCTURE NO. 87.

3. MAP GRID IS BASED ON FEET NORTH.

**NAVAL RESEARCH LABORATORY**  
WASHINGTON, D. C.  
GENERAL DEVELOPMENT MAP  
EXISTING & PLANNED PRE-MAY

**APPROVED BY COMMAND**

**SCALE**

**GRAPHIC SCALE**

**GRAPHIC SCALE 1:500**

**GRAPHIC SCALE 1:1000**

**GRAPHIC SCALE 1:2000**

**GRAPHIC SCALE 1:4000**

**GRAPHIC SCALE 1:8000**

**GRAPHIC SCALE 1:16000**

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# Listing of NRL Sites and Facilities

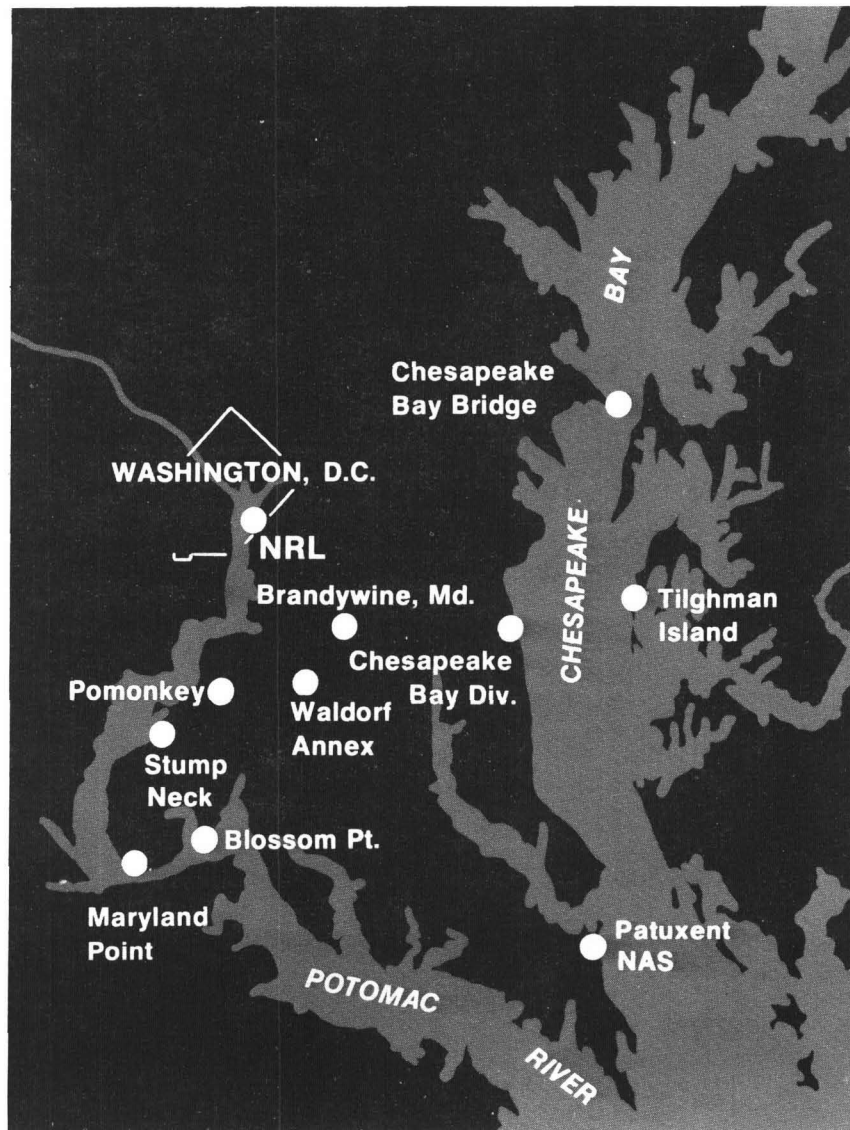
January 1, 1975

Station and Location	Acreage			Class I & II Plant Account	
	Fee Title	Easement or Purchase	Permit or Lease	Value	No. of Buildings and Structures
Naval Research Laboratory, Washington, D.C.	129.23		1.29	63,360,819	156
Cyclotron Building Site Bolling Air Force Base, D.C.			5.24	3,869,189	1
Radio Research Site Coast Guard Radio Station, Alexandria, Va.			55.40		
A&A Test Site, Shenandoah National Park, Luray, Va.			NA		
Coast Guard Station, Va. Beach			NA		
NRL Flight Support Detachment, Naval Air Station, Patuxent River, Md.			NA		
Chesapeake Bay Division, Chesapeake Beach, Md.	174.90			10,526,929	174
Multiple Research Site, Tilghman Island, Md.	2.00			110,662	9
Dock Facility, Chesapeake Bay, Md.			0.60	18,533	5
Theodolite Station, North Beach, Md.			0.29	800	1
Tunnel under Maryland State Road 261			NA		
Optics Research Platform in the Chesapeake Bay, Md.			0.23	1,500	2
Research Platform, Chesapeake Bay Bridge, Md.				21,400	1
2 Foghorn Platforms, Chesapeake Bay Bridge, Md.			NA		
Research Gondola, Chesapeake Bay Bridge, Md.			NA		
NRL Waldorf Annex, Md.	23.94	35.16		1,291,301	35
Radio Astronomy Observatory, Maryland Point, Md.	24.30		197.88	265,988	12
Radio Antenna Range, USAF Receiver Site, Brandywine, Md.			22.98		
Radio Research Site, Stump Neck Annex, Naval Ordnance Station, Indian Head, Md.			5.90		
Free Space Antenna Range, Pomonkey, Md.	14.12	28.40		811,768	13
Navy Radio Research Station, Sugar Grove, West Va.				74,091	2
Satellite Tracking Facility, Blossom Point, Md.			23.00		
Edgewood Arsenal, Md.			NA		
Underwater Sound Reference Division, Orlando, Fla.	10.46			1,242,389	32
USRD, Leesburg Facility, Bugg Spring, Fla.			6.92	198,267	11
Marine Corrosion Laboratory, Key West, Fla.			NA		
*Underwater Track Facility Argus Island (near Bermuda)			NA		
Research Site, Wayne County, West Va.			NA		
Berthing for USNS HAYES and MIZAR, GSA Pier, Alexandria, Va.			NA		
Totals:	1,812.96	66.41	319.73	77,550,969	

\*Now being screened for disposal

## Location of Principal Field Stations

Another station is located at Sugar Grove, W. Va. The Underwater Sound Reference Division is located at Orlando, Fla.



## Research Platforms

### Aircraft

1. The S2D (BUNO 149240) contains specially installed equipment and wing-mounted pods for cloud physics research. It is also used in chaff research and for short-term experiments compatible with space limitations of the aircraft.
2. The EC-121K (BUNO 135753) is used for research in cloud physics, ECM, low-frequency radar, and various projects requiring minimal aircraft conversion.
3. The EC-121K (BUNO 141297) is used mainly by the Tactical Electronic Warfare Division to experiment, evaluate, and improve Fleet electronic warfare capabilities.
4. The P3A (BUNO 149670) is primarily used for airborne radiometric studies and to a lesser degree for cloud physics and acoustic research.

### Available Ships

1. USNS MIZAR (T-AGOR-11) Under operational control of  
MSCLANT. Scheduled by NRL.
2. USNS HAYES (T-AGOR-16)  
(Will use the inherent catamaran design to accomplish oceanographic and acoustics research at sea)
3. Fleet units are regularly scheduled for NRL in support of CNO assigned projects by OPTEVFOR.

## DIRECTORY OF KEY OFFICES AND PERSONNEL

<u>Code</u>	<u>Office and Incumbent</u>	<u>Ext.</u>
<b>OFFICE OF DIRECTOR</b>		
1000	Director	CAPT J.T. Geary 73403
1001	Executive Assistant	Mr. S.L. Cohen 73231
1003	DEEO Officer	Mr. W.H. Webster 72486
1005	Public Affairs Officer	Mr. J.E. Sullivan 72541
1200	Chief Staff Officer	CAPT J.M. Brozena 73621
1226	Security Section	Mr. R.E. Abercrombie 73711
1300	Comptroller	Mr. P.F. Kennedy 73405
1800	Director of Civ. Pers.	Mr. F.D. Wallace 73421
1810	Personnel Operations	Mr. D.J. Blome 73030
<b>SUPPORT SERVICES DEPARTMENT</b>		
2000	Director of Support Services	CAPT M.V. Ricketts 72879
2300	Engineering Services Officer	CDR H.D. Swanson, Jr. 72300
2400	Supply Officer	CDR R.W. Gunther 73446
2500	Public Works Officer	CDR A.E. Church, Jr. 73371
2600	Head Tech. Info. Div.	Mr. E.E. Kirkbride 73388
2700	Chesapeake Bay Div. Officer	CDR J.M. Fitts
(CBD Interdepartmental Dial System Tel. No. is 1220-201, Outside Tel. No. is Area Code 301-257-2111)		
<b>RESEARCH DEPARTMENT</b>		
4000	Director of Research	Dr. A. Berman 73301
4010	Research Program Office	Mr. A. Hollings 73081
5000	Assoc. Director of Research for	
	Electronics	Dr. H.Q. North 73324
5200	Electronics Div. Supt.	Mr. A. Brodzinsky 73525
5300	Radar Div. Supt.	Dr. M.I. Skolnik 72936
5400	Commun. Science Div. Supt.	Dr. B. Wald 72903
5500	Optical Sciences Div. Assoc. Supt.	Dr. L.F. Drummeter, Jr. 73681
5700	Tactical Elect. Warfare Div. Supt.	Mr. L.A. Cosby 72191
6000	Assoc. Director of Research for	
	Materials and General Sciences	Dr. A.I. Schindler* 73566
6030	Lab for Structure of Matter	Dr. J. Karle 72665
6050	Lab for Chemical Physics	Dr. W.A. Zisman 73546
6100	Chemistry Div. Supt.	Dr. R.E. Kagarise 73026
6300	Engineering Materials Div. Supt.	Mr. L.E. Steele* 72926
6400	Material Sciences Div. Supt.	Dr. C.C. Klick 73351
6600	Radiation Technology Div. Supt.	Dr. J. McElhinney 72931
7000	Assoc. Director of Research for	
	Space Science and Technology	Dr. H. Rabin 72964
7020	Lab for Cosmic Ray Physics	Dr. M.M. Shapiro 72965
7030	Advanced Projects Office Mgr.	Mr. R.D. Mayo 72043
7040	Spacecraft Technology Center	Mr. P.G. Wilhelm 72073
7100	Space Science Div. Supt.	Dr. H. Friedman 73363
7700	Plasma Physics Div. Supt.	Dr. R. Shanny 72723
7900	Space Systems Div. Supt.	Mr. N.W. Guinard 73468
8000	Assoc. Director of Research for	
	Oceanology	Dr. R.R. Goodman 73294
8100	Acoustics Div. Supt.	Dr. J.C. Munson 73482
8200	Underwater Sound Ref. Div. Supt.	Mr. R.J. Bobber
(Area Code 305-859-5120 or via AUTOVON NTC 791-4111)		
8300	Ocean Sciences Div. Supt.	Dr. V.J. Linnenbom 72974
8400	Ocean Technology Div. Supt.	Dr. J.P. Walsh 73314

\*Indicates acting

### MISCELLANEOUS

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IDS, Incoming 19-(Ext.)	
Direct in Dialing (Area Code 202) 76-(Ext.)	
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4555 Overlook Avenue, S.W.	
Washington, D.C. 20375	